UPPER YARD INTERIM ACTION
AS-BUILT REPORT

UNOCAL EDMONDS TERMINAL

EDMONDS, WA

VOLUME II APPENDICES

Prepared for

Unocal Corporation

August 25, 2003

Prepared by

Maul Foster & Alongi, Inc.
19401 40th Avenue West
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Project # 9077.01.07

APPENDIX A

CULTURAL RESOURCE SURVEY

CASCADIA
ARCHAEOLOGY

P.O. Box 51058 Seattle, WA 98115-1058
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March 27, 2002

Linda Dawson
Principal Scientist
Maul, Foster, & Alongi, Inc.
1717 Bothell Way NE #264
Seattle, WA 98155

Re: Archaeological Survey at the Unocal Bulk Facility (Edmonds)

Dear Ms. Dawson:

This letter report describes the results of Cascadia Archaeology's cultural resource survey of the vegetated areas in the upper yard of the Unocal Edmonds Terminal (Contract 9077.01.04). Letter reports, *Archaeological Monitoring at the Unocal Bulk Facility (Edmonds), Lower Yard* and *Archaeological Monitoring at the Unocal Bulk Facility (Edmonds), Upper* Yard, submitted by Stephen C. Cole in February 2002, present the previous the results of cultural resources monitoring. Located in Sections 23 and 26, Township 27 north, Range 3 east, the terminal's upper yard occupies the area above Point Edwards, in Edmonds, Washington. At this time, several options remain viable for this section of the project area including potential construction, clearing for SR104 alignment, and clearing or thinning for view purposes. For this segment, work was carried out on March 18th, 21st, and 26th, 2002.

Methods

Several survey methods were applied to the project area depending upon the type of terrain and density of the vegetation encountered. Area A (see attached map), the vegetated area located adjacent to the entrance road, was examined using 10-meter pedestrian transects combined with shovel probes placed every 20 meters along the survey transects. Area B, the vegetated area between the lower and upper yard, mainly consisted of steep slopes up to 50 degrees. This area was examined by using pedestrian contour transects excluding shovel probes except for level areas at the top of the slope. The third area (area C), located in the upper parcel south of Pine Street, contained dense areas of intrusive blackberries, Indian plum, and salmon berry that required some clearing to penetrate. This area was examined using 20 meter pedestrian transects combined with shovel probes located every 20 meters along each survey transect.

Results

Twelve transects running north/south and 51 shovel probes were used to examine Area A east of the interior road. The small vegetated area west of the interior road had up to 50 percent visibility and was pedestrian surveyed using four small transects. Other than old-growth stumps exhibiting spring board notches, no cultural material was observed. Many of the shovel probes produced charcoal, some in large quantities associated with burnt wood and soils, but no associated artifacts were recovered. Potentially, the burning could be related to logging or road construction. An additional shovel probe was added in the lower northeast corner, in one of these heavily burned areas close to the road, but again, no cultural material was recovered.

Area B was broken up into three sub-areas: east of the upper yard piping system, west of the upper yard piping system, and the southeast corner bench. The east and west subdivision occurred because of an impassible chain-link fence running west of the upper yard piping system. Four contour transects running perpendicular to the incline and three shovel probes were used to examine the eastern section. The shovel probes were placed on three prominent flat areas on the bench above the high incline area approximately 30 to 40 meters apart. No prehistoric archaeological material was observed. Modern refuse (i.e., light bulbs, corrugated tin sheet fragments) was observed along the surface of the upper portion of the incline in proximity to the tank platforms and an isolated 14-in diameter, 1-in thick, 3.25-in wide very oxidized steel ring was located near the upper yard piping system, possibly related to an older pipeline. No other historical material was observed.

The western section, also a steep incline area, was examined using three contour transects. Shovel probes were placed in the upper level area (see below). Again no prehistoric or concentrated historic material was detected. Modern refuse was observed along with a possible old metal brake fluid container between the platforms for tanks 1749 and 2603, but there was no additional historical material.

The southwestern bench area directly above the area of steep slope was surveyed using shovel probes located at 20 meter intervals along two transects running north/south and a perpendicular transect running to the west. A total of twelve shovel probes was excavated, recovering creosote material related to the tank platforms and a single piece of light brown glass exhibiting manufacturing-related bubbles from the most westerly probe. Other modern refuse was observed on the surface, but no additional historic or prehistoric materials were noted.

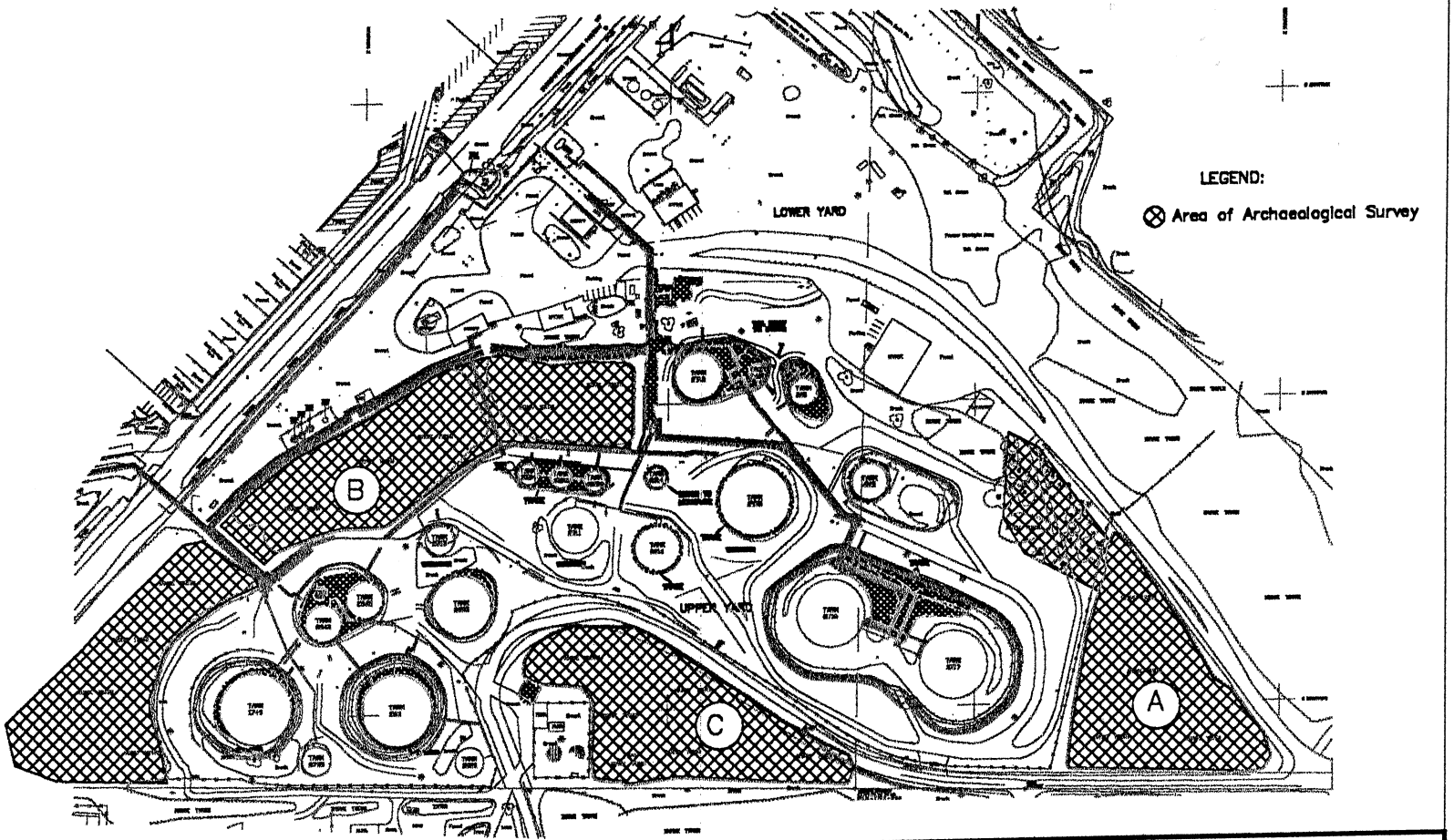
Eleven transects running north/south and 30 shovel probes were placed in Area C. Sections of this area, especially the western third, have very little topsoil (possibly removed during the road or building construction) and the northwest corner has been heavily used for modern dumping. Charcoal was present throughout the area, but was not associated with any cultural material. The northern tip of this area did produce a rich, very dark brown soil containing a heat spall and small fire-modified rock. Two additional probes were placed 2.5 meters east and 3 meters northwest of the original probe. An additional heat spall was recovered, but no other cultural material was observed. At the eastern-most point of this portion of the project area near the road, at least three glass milk bottles were found. These may have been dumped fairly recently. The eastern half of the land parcel did contain examples of old-growth stumps displaying spring-board notches. However no associated cultural material was observed.

In conclusion, this survey failed to identify any potentially significant cultural material within the project area. Scattered historical isolates were closely associated with modern refuse, and did not appear to be elements of larger concentrations of historical materials. No prehistoric cultural resources were encountered. It is, therefore, our opinion that future ground disturbances within the Upper Yard will have no adverse effect on cultural resources.

Sincerely

Renee Schwarzmiller
Staff Archaeologist

Randall Schalk, Ph.D.
Principal Archaeologist



MAP PROVIDED BY
MAUL FOSTER & ALONGI, INC.

ARCHAEOLOGICAL SURVEY AREAS OF
THE UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON

APPENDIX B

SOIL BORING AND TEST PIT DATA

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-236	1 of 2

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/26/02 to 6/26/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	H. Corner	Hole Depth	35.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1									0 to 2.5 feet: SAND WITH SILT (SP-SM); brown; fine; few to little organic material (wood roots); few fines; trace fine, subangular gravel; moist; no odor noted.
2									
3									2.5 to 8.0 feet: GRAVELLY CLAYEY SILT (MH); light green-gray with abundant orange mottling; medium plasticity; firm to stiff; little fine to medium subrounded gravel; moist; no odor noted. (TRANSITIONAL BEDS)
4									
5									
6				10 14 15	SS		0.0		
7									
8									8.0 to 17.5 feet: SAND WITH SILT (SP-SM); brown; fine; trace to few fines; moist; no odor noted. Very uniform. (TRANSITIONAL BEDS)
9									
10									
11				8 16 31	SS		8.1		
12									
13									
14									
15									@ 15.0 feet: moist to slightly wet.
16				12 33 40	SS		3.1		
17									
18									17.5 to 35.0 feet: SAND (SP); brown with orange staining; medium; moist; no odor noted. (TRANSITIONAL BEDS/WHIDBEY FORMATION)
19									
20									

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-236	2 of 2

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21				21 50/5"	SS		4.8		17.5 to 35.0 feet: SAND (SP), continued.
22									
23									
24									
25				12					
26				38	SS		1.1		
27				49					
28									
29									
30				19					
31				35	SS		1.6		
32				43					
33									
34									
35				21					Total Depth Drilled = 35.0 feet. Total Depth Sampled = 36.5 feet.
				24 50/5"	SS	SB-236-35	1.5		Boring backfilled with bentonite chips.

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-237	1 of 2

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/26/02 to 6/26/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	H. Corner	Hole Depth	35.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1									0 to 0.75 foot: GRAVELLY SAND (SP); brown; fine to medium; some fine to medium, subangular, gravel; moist; no odor noted. (FILL)
2									0.75 to 4.8 feet: CLAYEY SILT (MH); gray; medium plasticity; soft; trace fine to medium, subangular gravel; moist; slight hydrocarbon-like odor. (FILL)
3									
4									
5									4.8 to 6.5 feet: SAND (SP); brown; medium; moist; no odor noted. (FILL)
6									
7									6.5 to 13.0 feet: SILTY SAND (SM); gray; fine to medium; few low to medium plasticity fines; moist; no odor noted. (FILL/TRANSITIONAL BEDS)
8									
9									
10									
11									@ 11.0 feet: little to some fines.
12									
13									13.0 to 19.0 feet: SILTY SAND (SM); dark gray to brown; fine to medium; few fines; few organics (roots, wood); trace medium to coarse, subrounded gravel. (FILL/TRANSITIONAL BEDS)
14									
15				14					
16				15 12	SS		NRY		
17									
18				NR	SS		1.4		@ 18.0 feet: organic horizon.
19									
20									19.0 to 23.5 feet: GRAVELLY SILTY SAND (SM); gray; fine to medium; few to little fine to medium, subrounded gravel; few

NOTES: (1) SS = Split-spoon sampler.
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▽ **Water level at time of drilling.**

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-237	2 of 2

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21				6 12 12	SS		0.8		medium plasticity fines; moist to slightly wet; no odor noted. (FILL/TRANSITIONAL BEDS)
22									
23									
24									23.5 to 33.0 feet: SAND (SP); brown; fine to medium; trace fines; moist; no odor noted. Occasional grain-size partings. (TRANSITIONAL BEDS)
25				17					
26				35 50/5"	SS		1.4		
27									
28									
29									
30				19					@ 30.0 feet: fine sand, slightly wet.
31				28 37	SS	SB-237-30	0.8		
32									
33	▽								33.0 to 35.0 feet: SAND WITH SILT (SP-SM); gray; fine to medium; few fines; wet; no odor noted. Occasional small (up to 10 mm) lenses of sandy silt. (TRANSITIONAL BEDS)
34									
35				NR	SS				Total Depth Drilled = 35.0 feet. Total Depth Sampled = 36.5 feet. Boring backfilled with bentonite chips.

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

▽ **Water level at time of drilling.**

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Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-238	1 of 2

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/26/02 to 6/26/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	H. Corner	Hole Depth	35.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1									0 to 0.5 foot: GRAVELLY SAND (SP); gray-brown; fine to medium; some fine to medium, subangular gravel; moist; no odor noted. (FILL)
2									0.5 to 6.0 feet: SANDY SILT (MH); gray; medium plasticity; little fine sand; moist; no odor noted. (FILL)
3									
4									
5									
6									6.0 to 23.0 feet: SILTY SAND (SM); gray; fine; little fines; trace to few medium sand; moist to slightly wet; no odor noted. (FILL/TRANSITIONAL BEDS)
7									
8									
9									
10									
11									
12									
13									
14									
15				6					
16				11	SS		0.1		
17				15					
18									
19									
20									

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
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Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-238	2 of 2

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21				11 15 24	SS		NRY		6.0 to 23.0 feet: SILTY SAND (SM), continued.
22									
23									
24									23.0 to 29.0 feet: SAND (SP); brown; fine to medium; moist; no odor noted; very uniform. (TRANSITIONAL BEDS)
25				11					
26				31 47	SS	28-238-25	0.1		
27									
28									
29									
30				19					29.0 to 35.0 feet: SILTY SAND (SM); brown with orange staining; fine; few fines; trace to few medium sand; moist to wet; no odor noted. (TRANSITIONAL BEDS)
31				37 50/6"	SS	28-238-30	0.2		
32									
33									
34									
35									
				20 33 33	SS		0.2		Total Depth Drilled = 35.0 feet. Total Depth Sampled = 36.5 feet. Boring backfilled with bentonite chips.

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-239	1 of 2

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/26/02 to 6/27/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	H. Corner	Hole Depth	35.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1									0 to 0.5 foot: GRAVELLY SAND (SP); gray; medium; some fine to medium, subangular gravel; moist; no odor noticed. (FILL)
2									0.5 to 4.5 feet: SILTY SAND (SM); brown; fine to medium; few fines; trace fine to medium, subangular gravel; moist; no odor noted. (FILL)
3									
4									
5									4.5 to 22.0 feet: SILTY CLAY (CH); gray; medium plasticity; soft; moist; no odor noted. (FILL/TRANSITIONAL BEDS)
6									
7									
8									
9									
10									
11									
12									
13									
14									
15				8					
16				10	SS				
17				12					
18									
19									
20									

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
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Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-239	2 of 2

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21				8 11 12	SS				4.5 to 22.0 feet: SILTY CLAY (CH), continued.
22									22.0 to 28.0 feet: SAND (SP); brown; fine to medium; trace fines; moist; no odor noted. (TRANSITIONAL BEDS)
23									
24									
25				10					
26				32 50	SS				
27									
28									28.0 to 35.0 feet: SAND WITH SILT (SP-SM); brown with some orange mottling; fine to medium; few fines; moist; no odor noted. (TRANSITIONAL BEDS)
29									
30				18					
31				22 20	SS				
32									
33									
34									
35									Total Depth Drilled = 35.0 feet. Total Depth Sampled = 36.5 feet.
				NR	SS	SB-239-30			Boring backfilled with bentonite chips.

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-240	1 of 2

Project Name	**Unocal Edmonds Terminal**	TOC Elevation (feet above MSL)	
Project Location	**Edmonds, Washington**	Surface Elevation (feet above MSL)	
Start/End Date	**6/27/02 to 6/27/02**	Northing	
Driller/Equipment	**Cascade Drilling, Inc./Hollow-stem Auger**	Easting	
Geologist/Engineer	**H. Corner**	Hole Depth	**37.5-feet**
Sample Method	**Split-spoon sampler**	Outer Hole Diam	**8-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1									0 to 1.0 foot: SILTY SAND WITH GRAVEL (SM); gray; moist. (FILL)
2									1.0 to 4.0 feet: SANDY SILT WITH GRAVEL (ML); gray; low plasticity; little fine to medium sand; few fine to medium gravel; moist; no odor noted. (FILL/TRANSITIONAL BEDS)
3									
4									
5									4.0 to 10.5 feet: SILTY CLAY (CH); dark brown-gray; medium plasticity; few organics (roots); few fine to medium, subrounded to subangular gravel; moist; slight hydrogen sulfide-like odor. (TRANSITIONAL BEDS)
6									
7									
8				NA	SS		4.4		
9									
10									
11									10.5 to 16.0 feet: SILTY CLAY (CH); medium gray; medium plasticity; moist; abundant horizons of organic to rich silt in up to 8-cm-thick zones; no odor noted. (TRANSITIONAL BEDS)
12									
13				NA	SS		0.8		
14									@ 13.5 feet: wet.
15									
16									16.0 to 25.0 feet: CLAY/SILTY CLAY (CH); yellow-gray to gray with orange mottling; medium plasticity; stiff to very stiff; moist. (TRANSITIONAL BEDS)
17									
18				NA	SS		0.2		@ 17.5 to 19.0 feet: slight hydrogen sulfide-like odor.
19									
20									

NOTES:
(1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.
(4) This boring was angle-drilled; blow counts are not applicable.
(5) NA = Not applicable.
(6) SB-240 was drilled at an angle of 45 degrees from horizontal.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-240	2 of 2

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21									16.0 to 25.0 feet: CLAY/SILTY CLAY (CH), continued.
22									
23				NA	SS		0.0		@ 22.5 to 25.0 feet: massive clay.
24									
25									25.0 to 37.5 feet: CLAYEY SILT (ML); gray; low plasticity; stiff; moist; no odor noted; occasional grain size partings (up to 5-mm thick) of fine sand and silt. Rare lenses of orange to brown sandy silt.
26									
27									
28				NA	SS		0.0		
29									
30									
31									
32									
33				NA	SS		0.1		@ 32.5 to 34.0 feet: laminated.
34									
35									
36									
37									
				NA	SS	SB-240-37.5	NM		Total Depth Drilled = 37.5 feet. Total Depth Sampled = 39.0 feet. Boring backfilled with bentonite chips.

NOTES:
(1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.
(4) This boring was angle-drilled; blow counts are not applicable.
(5) NA = Not applicable.
(6) SB-240 was drilled at an angle of 45 degrees from horizontal.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-241	1 of 3

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/27/02 to 6/27/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	E. Silver	Hole Depth	45.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1–10									0 to 10.0 feet: SILTY SAND (SM); medium brown to gray; fine; few to little fines; moist; no odor noted.
10–18									10.0 to 18.0 feet: SANDY SILT (ML); medium gray; little fine sand; moist; no odor noted. (TRANSITIONAL BEDS)
15–16				18 21 25	SS		NR		
18–20									18.0 to 27.0 feet: SILTY CLAYEY SAND (SM); orange brown to medium gray; fine; little to some fines; moist; no odor noted. (TRANSITIONAL BEDS)

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-241	2 of 3

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21				16 16 17	SS		12.0		18.0 to 27.0 feet: SILTY CLAYEY SAND (SM), continued.
23									@ 23.0 feet: wet.
25				15					
26				15 16	SS		28		
27									27.0 to 34.0 feet: SAND (SP); gray; fine; trace silt; hard; moist; no odor noted. (TRANSITIONAL BEDS)
30				12					
31				20 23	SS		18		
33									@ 33.0 feet: very moist.
35				11					34.0 to 45.0 feet: CLAY WITH SILT (CL); light to medium gray; few to little silt; very hard; moist; no odor noted. (TRANSITIONAL BEDS)
36				15 18	SS		6.9		
40				10					
41				24 26	SS		0.1		

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-241	3 of 3

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
43									CLAY WITH SILT (CL), continued.
44									
45									
				23					Total Depth Drilled = 45.0 feet.
				50/6"	SS	SB-241-45	0		Total Depth Sampled = 46.5 feet.
									Boring backfilled with bentonite chips.

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-242	1 of 2

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/28/02 to 6/28/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	H. Corner/E. Silver	Hole Depth	40.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1–10									0 to 10.0 feet: SILT WITH SAND (MH); gray-brown; medium plasticity; few fine sand; moist; slight hydrogen sulfide-like odor. (FILL)
10–14									10.0 to 14.0 feet: CLAY (CH); gray; moderate plasticity; soft; moist; no odor noted. (TRANSITIONAL BEDS)
14–20				8 8 9	SS		3.6		14.0 to 40.0 feet: INTERBEDDED SANDY SILT AND SILT (ML); gray; few to little fine sand, laminated (2- to 5-mm laminae) to massive; laminae are predominantly fine to medium sand; dark gray; moist; no odor noted. Occasional lenses of fine to medium brown sand. (TRANSITIONAL BEDS)

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-242	2 of 2

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21				8 9 12	SS		0.3		14.0 to 40.0 feet: INTERBEDDED SANDY SILT AND SILT (ML), continued.
25				6 8 10	SS		0.3		
30				6 14 17	SS		0.1		
35				6 22 28	SS		3.9		
40				22 50/6"	SS	SB-242-40	2.6		Total Depth Drilled = 40.0 feet. Total Depth Sampled = 41.5 feet. Boring backfilled with bentonite chips.

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-243	1 of 3

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/27/02 to 6/27/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	E. Silver	Hole Depth	45.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1–14									0 to 18.0 feet: SILTY SAND (SM); medium gray; fine; some silt; trace iron nodules; stiff; slightly moist; slight hydrogen-sulfide-like odor. (FILL)
15				13					
16				20	SS		1.2		
17				23					
18–20									18.0 to 23.0 feet: CLAYEY SAND (SM); medium to light gray; some fines; very stiff; dry; no odor noted. (TRANSITIONAL BEDS)

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-243	2 of 3

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21				12 15 18	SS		0.9		18.0 to 23.0 feet: CLAYEY SAND (SM), continued.
22									
23									
24									23.0 to 25.0 feet: SAND (SP); gray; fine; very moist; no odor noted. (TRANSITIONAL BEDS)
25				16					
26				24 25	SS		0.8		25.0 to 41.0 feet: CLAY WITH SAND AND SILT (CL); medium gray; very stiff; grain partings on a 1/8-inch scale; dry; no odor noted. Gradational contact with underlying clayey sand. (TRANSITIONAL BEDS)
27									
28									
29									
30				12					
31				16 20	SS		0.6		
32									
33									
34									
35				15					
36				23 28	SS		0.9		
37									
38									
39									
40				12					@ 40.0 to 41.5 feet: light gray nodules, iron oxidation.
41				18 25	SS		1.1		
42									41.0 to 45.0 feet: CLAYEY SAND (SM); medium gray to tan; fine; little clay; moist; no odor noted. (TRANSITIONAL BEDS)

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-243	3 of 3

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
43									25.0 to 41.0 feet: CLAY WITH SAND AND SILT (CL), continued.
44									@ 43.0 to 45.0 feet: grades into silty clay; medium gray; very stiff.
45									
				8					Total Depth Drilled = 45.0 feet.
				15	SS	SB-243-45	1.0		Total Depth Sampled = 46.5 feet.
				16					Boring backfilled with bentonite chips.

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-244	1 of 2

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/27/02 to 6/27/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	H. Corner	Hole Depth	32.5-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1–12									0 to 12.0 feet: SAND WITH SILT (SP-SM); gray-brown; fine to medium; trace to few fines; moist; no odor noted. (FILL/TRANSITIONAL BEDS)
13									12.0 to 17.0 feet: SAND WITH SILT (SP-SM); gray; fine to medium; few fines; common interbedded sandy silt, laminated; trace organic material; wet; no odor noted. (FILL/TRANSITIONAL BEDS)
14				NA	SS		0.9		
15–17									
18									17.0 to 22.0 feet: SAND (SP); gray with orange-brown mottling; medium; trace fine, subangular gravel; moist; no odor noted. (FILL/TRANSITIONAL BEDS)
19				NA	SS		0.4		
20									

NOTES:
(1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.
(4) This boring was angle-drilled; blow counts are not applicable.
(5) NA = Not applicable.
(6) SB-244 was drilled at an angle of 65 degrees from horizontal.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-244	2 of 2

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21									17.0 to 22.0 feet: SAND (SP)
22									
23									22.0 to 27.0 feet: SAND WITH SILT (SP-SM); gray; fine; few fines; trace organic material; medium and dark gray laminations 2- to 8-mm thick. (FILL/TRANSITIONAL BEDS)
24				NA	SS		0.1		
25									
26									
27									27.0 to 32.5 feet: SILTY CLAY (CL); gray; stiff; massive; moist; no odor noted. (TRANSITIONAL BEDS)
28									
29				NA	SS		NR		
30									
31									
32									
				NA	SS	SB-244-32.5	0.0		Total Depth Drilled = 32.5 feet. Total Depth Sampled = 34.0 feet. Boring backfilled with bentonite chips.

NOTES:
(1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.
(4) This boring was angle-drilled; blow counts are not applicable.
(5) NA = Not applicable.
(6) SB-244 was drilled at an angle of 65 degrees from horizontal.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-245	1 of 2

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/27/02 to 6/27/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	H. Corner	Hole Depth	30.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1–12									0 to 12.0 feet: SAND (SP); gray; fine to medium; trace fines; trace fine to medium gravel; moist; no odor noted. (FILL/TRANSITIONAL BEDS)
12–18									12.0 to 18.0 feet: SAND WITH SILT (SP-SM); gray; fine to medium; few fines; trace fine to medium subrounded gravel; trace organic material (roots); wet; no odor noted. (TRANSITIONAL BEDS)
14–15				NA	SS		0.4		
18–23									18.0 to 23.0 feet: SILTY CLAY (CH); gray; medium plasticity; massive; stiff; rare fine to medium sand partings; moist; slight hydrogen-sulfide-like odor. (TRANSITIONAL BEDS)

NOTES:
(1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.
(4) This boring was angle-drilled; blow counts are not applicable.
(5) NA = Not applicable.
(6) SB-245 was drilled at an angle of 65 degrees from horizontal.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-245	2 of 2

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21				NA	SS		0.4		18.0 to 23.0 feet: SILTY CLAY (CH), continued.
22									
23									23.0 to 30.0 feet: SILTY SAND (SM); gray; fine; little to some fines; stiff; moist; no odor noted. Occasional horizons of fine sand. (TRANSITIONAL BEDS)
24									
25									
26				NA	SS		0.3		
27									
28									
29									
30									Total Depth Drilled = 30.0 feet. Total Depth Sampled = 31.5 feet.
				NA	SS	SB-245-30	0.4		Boring backfilled with bentonite chips.

NOTES:
(1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.
(4) This boring was angle-drilled; blow counts are not applicable.
(5) NA = Not applicable.
(6) SB-245 was drilled at an angle of 65 degrees from horizontal.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-246	1 of 4

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/27/02 to 6/28/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	H. Corner	Hole Depth	80.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1–8									0 to 8.0 feet: SAND (SP); gray; fine to medium; trace fines; trace gravel; moist; no odor noted. (FILL/TRANSITIONAL BEDS)
8–20									8.0 to 28.0 feet: CLAY (CH); gray; medium to high plasticity; sitff; dense; generally massive but with occasional horizons or lenses of fine to medium silty sand; moist; no odor noted. (TRANSITIONAL BEDS)
15–17				22 30 39	SS		0.6		

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-246	2 of 4

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21				22 47 40	SS		0.4		8.0 to 28.0 feet: CLAY (CH), continued.
25				21					@ 25.0 feet: wet.
26				22 34	SS	SB-246-25	0.4		
28									28.0 to 45.0 feet: SAND WITH SILT (SP-SM); gray; fine to medium; trace coarse sand; wet; no odor noted. (TRANSITIONAL BEDS)
30				22					
31				31 32	SS	SB-246-30	0.2		

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-246	3 of 4

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
43									28.0 to 45.0 feet: SAND WITH SILT (SP-SM), continued.
44									
45									45.0 to 75.0 feet: INTERBEDDED SILTY SAND AND SANDY SILT (SM/ML); gray; moist; no odor noted. SILTY SAND is fine; little to some fines. SANDY SILT is low plasticity; stiff; few to some fine sand; laminated. Common horizons of massive silt with occasional fine to medium sand laminae 1- to 2-mm thick. (TRANSITIONAL BEDS)
46									
47									
48									
49									
50				30					
51				31	SS		0.4		
52				31					
53									
54									
55									
56									
57									
58									
59									
60				30					
61				34	SS		0.2		
62				50/2"					
63									
64									
65									

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-246	4 of 4

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
66									45.0 to 75.0 feet: INTERBEDDED SILTY SAND AND SANDY SILT (SM/ML), continued.
67									
68									
69									
70				41					
71				50/4"	SS		0.3		
72									
73									
74									
75									75.0 to 80.0 feet: SAND (SP); black and white with orange staining; medium; trace fine sand; moist; no odor noted. (WHIDBEY FORMATION)
76									
77									
78									
79									
80									Total Depth Drilled = 80.0 feet. Total Depth Sampled = 81.5 feet. Boring backfilled with bentonite chips.

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-247	1 of 2

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/28/02 to 6/28/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	E. Silver	Hole Depth	35.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1									0 to 1.0 foot: SILTY SAND (SM); medium brown; dry; no odor noted. (FILL)
2									1.0 to 4.0 feet: CLAYEY SILT (ML); medium brown; little medium brown to maroon and gray clay; trace to few fine sand; trace organic material (roots); moist. (TRANSITIONAL BEDS)
3									@ 2.0 feet: few gravel, 12-inch cobble.
4									
5				4 6 7	SS		0.2		4.0 to 9.0 feet: SILTY CLAY (CL); mottled gray and orange-brown; hard; some silt; moist; no odor noted. (TRANSITIONAL BEDS) @ 4.0 to 4.5 feet: clayey sand; medium orange-brown; fine.
6									
7									
8									
9									
10				3 6 8	SS		0.1		9.0 to 14.0 feet: SILTY CLAY WITH SAND (CL); medium to dark gray; little silt; few sand; moist; no odor noted. (TRANSITIONAL BEDS) @ 9.5 feet: sandy clay.
11									
12									
13									
14									
15				8 13 15	SS		0.1		14.0 to 19.0 feet: SILTY CLAYEY SAND (SM); medium gray with light gray mottling; fine; some silt; little clay; dry; no odor noted. Silt and clay fractions change with depth. (TRANSITIONAL BEDS)
16									
17									
18									
19									
20				9 13	SS		0.1		19.0 to 22.0 feet: SAND (SP); medium gray; fine; trace fines; moist; no odor noted. (TRANSITIONAL BEDS)

NOTES: (1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.
(4) * Duplicated 35' sample as SB-247-40 at 12:35 (false time).

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-247	2 of 2

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
21				16					19.0 to 22.0 feet: SAND (SP), continued.
22									
23									22.0 to 27.0 feet: SILTY SAND WITH CLAY (SM); light to medium gray; fine; some silt; few clay; hard; dry; no odor noted. Silt and clay fractions vary with depth. (TRANSITIONAL BEDS)
24				9					
25				9	SS		0.2		
26				12					
27									27.0 to 35.0 feet: SANDY CLAY (CL); medium gray with some light gray; some silt partings; hard; dry; no odor noted. (TRANSITIONAL BEDS)
28									
29				14					
30				17	SS		0.2		
31				19					
32									
33									
34				16					
35				20	SS	*SB-247-35	0.1		
				20					Total Depth Drilled = 35.0 feet. Total Depth Sampled = 35.5 feet. Boring backfilled with bentonite chips.

NOTES:
(1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.
(4) * Duplicated 35' sample as SB-247-40 at 12:35 (false time).

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-248	1 of 2

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/28/02 to 6/28/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	H. Corner	Hole Depth	20.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1–5									0 to 6.5 feet: CLAYEY SANDY SILT (MH); gray; medium plasticity; few to little fine sand; laminated to massive; moist; no odor noted. (TRANSITIONAL BEDS)
6				NA	SS		0.1		
7									6.5 to 8.0 feet: SILTY SAND (SM); brown gray; fine to medium; little fines; moist; no odor noted. (TRANSITIONAL BEDS)
8–10									8.0 to 18.0 feet: INTERBEDDED SAND WITH SILT AND SILT (SP-SM/ML); SAND with SILT is fine to medium; few fines; trace organic material (wood); silt is low plasticity; laminated; occasional sandy partings. (TRANSITIONAL BEDS)
11				NA	SS		0.1		
12–15									
16				NA	SS		0.2		
17–18									
19–20									18.0 to 20.0 feet: SAND (SP); brown with orange mottling; fine to medium; moist; no odor noted; abundant interbedded silt. (TRANSITIONAL BEDS)

NOTES:
(1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.
(4) * Duplicated 20' sample as SB-248-25.
(5) This boring was angle-drilled; blow counts are not applicable.
(6) NA = Not applicable.
(7) SB-248 was drilled at an angle of 75 degrees from horizontal.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-248	2 of 2

Depth (feet, BGS)	Well Details	Sample Data: Interval	Sample Data: Percent Recovery	Sample Data: Blow Counts	Sample Data: Type	Sample Data: Name	PID (ppm)	Lithologic Column	Soil Description
				NA	SS	*SB-248-20			Total Depth Drilled = 20.0 feet. Total Depth Sampled = 21.5 feet. Boring backfilled with bentonite chips.

NOTES:
(1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.
(4) * Duplicated 20' sample as SB-248-25.
(5) This boring was angle-drilled; blow counts are not applicable.
(6) NA = Not applicable.
(7) SB-248 was drilled at an angle of 75 degrees from horizontal.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Boring Number	Sheet
9077.01.07	SB-249	1 of 1

Project Name	Unocal Edmonds Terminal	TOC Elevation (feet above MSL)	
Project Location	Edmonds, Washington	Surface Elevation (feet above MSL)	
Start/End Date	6/28/02 to 6/28/02	Northing	
Driller/Equipment	Cascade Drilling, Inc./Hollow-stem Auger	Easting	
Geologist/Engineer	H. Corner	Hole Depth	15.0-feet
Sample Method	Split-spoon sampler	Outer Hole Diam	8-inch

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Blow Counts	Type	Name	PID (ppm)	Lithologic Column	Soil Description
1									0 to 2.0 feet: CLAYEY SANDY SILT (MH); gray; medium plasticity; few to little fine sand; massive; moist; no odor noted. (TRANSITIONAL BEDS)
2									
3									2.0 to 3.0 feet: SILTY SAND (SM); brown-gray; fine to medium; little fines; moist; no odor noted. (TRANSITIONAL BEDS)
4									3.0 to 8.0 feet: SILTY CLAY (CH); gray; medium plasticity; massive; very stiff; moist; no odor noted; rare sandy silt partings with trace organics. (TRANSITIONAL BEDS)
5									
6				NA	SS		0.1		
7									
8									8.0 to 13.0 feet: CLAYEY SILT (ML); gray; nonplastic to low plasticity; friable; moist; no odor noted. (TRANSITIONAL BEDS)
9									
10									
11				NA	SS		0.1		
12									
13									13.0 to 15.0 feet: INTERBEDDED SAND WITH SILT AND SILT (SP-SM/ML); moist; no odor noted. Sand with silt is brownish-gray; fine to medium; few fines; silt is gray-brown; laminated. (TRANSITIONAL BEDS)
14									
15									
				NA	SS	SB-249-15	0.4		Total Depth Drilled = 15.0 feet. Total Depth Sampled = 16.5 feet. Boring backfilled with bentonite chips.

NOTES:
(1) SS = Split-spoon sampler.
(2) NR = Not recorded.
(3) NRY = No recovery.
(4) This boring was angle-drilled; blow counts are not applicable.
(5) NA = Not applicable.
(6) SB-249 was drilled at an angle of 75 degrees from horizontal.

GBLWC-2 C:\PROGRA~1\GINTW\MFAIPROJECTS\UNOCALE.GPJ 3/5/03

APPENDIX C

YARDAGE ESTIMATE AND POST EXCAVATION SURVEY DRAWING

MEMORANDUM

TRIAD ASSOCIATES

Date:	June 12, 2003 (revised)
To:	Linda Dawson (MFA, Inc.)
From:	Lonnie Carlson
Re:	Unocal Edmonds (Upper Yard)
Triad Job No.:	02-187
Copies To:	Gus Osterback (Triad)

RECEIVED
JUN 13 2003
By

11814 115th Avenue NE
Kirkland, WA 98034-6923

425.821.8448
425.821.3481 fax
800.488.0756 toll free

www.triadassoc.com

The following lists the excavated yardages within noted areas.

BASIN AREA	YARDAGE
Area "K"	4350 cu.yds.
SWL	1950 cu.yds.
ASWL 1	1100 cu.yds.
Area "U"	2400 cu.yds.
ASWL 2	1800 cu.yds.
Basin 218	2125 cu.yds.
Basin 2605	13,250 cu.yds.
Basin 3392-3394	1,675 cu.yds.
Basin 2911	3500 cu.yds.
Basin 2910	2850 cu.yds.
Basin 2909	5350 cu.yds.
Basin 4120	8700 cu.yds.
Basin 2912/F410	4950 cu.yds.
Basin 1749	11,500 cu.yds.
Basin 2798	585 cu.yds.
Basin 263	14,050 cu.yds.
Basin 2606	3,000 cu.yds.
Basin 2602/2603/2604	13,500 cu.yds.
Basin 2913	900 cu.yds.
Basin 2914	450 cu.yds.

Note: Estimated yardage based on comparison of collected field survey data (circa. 2002-2003) to existing condition survey compiled from 1993 aerial topographic mapping of the Unocal site.

APPENDIX D

BACKFILL AND COMPACTION DOCUMENTATION

Edmonds Bulk Terminal

Rinker Materials Company

Date	Product	Quantity (tons)	Acc Total (tons)
12/16/02	2" Ballast	55.68	55.68
02/14/03	2" Ballast	58.83	114.51
07/23/02	2x4	91.96	91.96
07/24/02	2x4	120.90	212.86
07/25/02	2x4	59.85	272.71
07/26/02	2x4	92.40	365.11
09/04/02	2x4	31.40	396.51
09/17/02	2x4	31.11	427.62
10/04/02	2x4	31.18	458.80
10/10/02	2x4	30.17	488.97
11/06/02	2x4	31.56	520.53
11/25/02	2x4	154.26	674.79
11/25/02	2x4	64.23	739.02
11/27/02	2x4	62.69	801.71
12/02/02	2x4	346.57	1148.28
12/03/02	2x4	258.79	1407.07
12/04/02	2x4	249.60	1656.67
12/05/02	2x4	154.56	1811.23
12/10/02	2x4	64.97	1876.20
12/13/02	2x4	245.71	2121.91
12/16/02	2x4	403.01	2524.92
12/17/02	2x4	417.75	2942.67
12/18/02	2x4	653.13	3595.80
12/19/02	2x4	776.78	4372.58
12/20/02	2x4	738.73	5111.31
12/23/02	2x4	284.68	5395.99
01/02/03	2x4	505.90	5901.89
01/03/03	2x4	123.05	6024.94
01/10/03	2x4	29.34	6054.28
01/13/03	2x4	369.92	6424.20
01/14/03	2x4	112.04	6536.24
01/15/03	2x4	332.27	6868.51
01/17/03	2x4	61.85	6930.36
01/22/03	2x4	232.88	7163.24
01/23/03	2x4	435.26	7598.50

Summary of materials imported from Rinker to Edmonds Terminal during U41A.

Imported Material

01/24/03	2x4	29.71	7628.21
02/03/03	2x4	237.17	7865.38
02/04/03	2x4	33.09	7898.47
02/06/03	2x4	273.99	8172.46
02/07/03	2x4	234.09	8406.55
02/10/03	2x4	307.40	8713.95
02/13/03	2x4	244.33	8958.28
02/14/03	2x4	347.17	9305.45
02/17/03	2x4	335.24	9640.69
02/17/03	2x4	58.96	9699.65
02/20/03	2x4	123.27	9822.92
02/21/03	2x4	280.31	10103.23
02/24/03	2x4	62.92	10166.15
02/25/03	2x4	450.00	10616.15
02/26/03	2x4	361.39	10977.54
03/10/03	2x4	209.84	11187.38
03/13/03	2x4	121.47	11308.85
03/15/03	2x4	64.82	11373.67
03/17/03	2x4	30.27	11403.94
03/20/03	2x4	62.42	11466.36
03/21/03	2x4	93.68	11560.04
03/24/03	2x4	62.70	11622.74
03/25/03	2x4	94.52	11717.26
03/26/03	2x4	28.47	11745.73
03/27/03	2x4	26.92	11772.65
05/05/03	2x4	91.67	11864.32
05/15/03	2x4	13.17	11877.49
08/28/02	4x8	62.46	62.46
08/29/02	4x8	30.99	93.45
10/03/02	4x8	31.88	125.33
11/06/02	4X8	65.44	190.77
11/26/02	4x8	308.74	499.51
11/26/02	4x8	61.44	560.95
12/13/02	4x8	120.35	681.30
08/28/02	Asphalt/Soil disp	65.12	65.12
09/04/02	Asphalt/Soil disp	95.50	160.62
09/10/02	Asphalt/Soil disp	43.20	203.82
09/17/02	Asphalt/Soil disp	79.81	283.63
09/19/02	Asphalt/Soil disp	53.54	337.17
09/20/02	Asphalt/Soil disp	56.83	394.00

10/17/02	Asphalt/Soil disp	25.75	419.75
03/07/03	Conc Dump	51.62	51.62
03/10/03	Conc Dump	173.25	224.87
03/27/03	Conc Dump	-62.35	162.52
05/20/03	Conc Dump	77.94	240.46
05/21/03	Conc Dump	29.47	269.93
02/03/03	Dirt Dump	22.46	22.46
04/01/03	Asphalt/Soil disp	665.81	665.81
04/02/03	Asphalt/Soil disp	1076.54	1742.35
04/03/03	Asphalt/Soil disp	32.00	1774.35
04/10/03	Asphalt/Soil disp	362.78	2137.13
04/11/03	Asphalt/Soil disp	514.46	2651.59
04/14/03	Asphalt/Soil disp	260.34	2911.93
05/21/03	Asphalt/Soil disp	63.46	2975.39
05/27/03	Asphalt/Soil disp	164.52	3139.91
05/28/03	Asphalt/Soil disp	160.20	3300.11
05/29/03	Asphalt/Soil disp	148.35	3448.46
05/30/03	Asphalt/Soil disp	152.39	3600.85
10/30/02	Base Course	16.20	16.20
12/10/02	Base Course	31.43	47.63
12/11/02	Base Course	35.32	82.95
02/05/03	Base Course	17.49	100.44
02/14/03	Base Course	30.03	130.47
02/20/03	Base Course	59.56	190.03
05/21/03	Base Course	63.58	253.61
01/17/03	3/4" Washed	19.65	19.65
01/22/03	3/4" Washed	17.58	37.23
02/07/03	3/4" Washed	60.35	97.58
02/10/03	3/4" Washed	31.16	128.74
03/13/03	3/4" Washed	13.56	142.30
05/13/03	1 1/4" Washed	16.51	16.51
05/27/03	1 1/4" Washed	58.99	58.99
05/28/03	1 1/4" Washed	59.24	59.24
05/30/03	1 1/4" Washed	30.56	30.56
04/01/03	Washed Sand	1241.33	1241.33
04/01/03	Washed Sand	1341.73	2583.06
04/01/03	Washed Sand	1466.55	4049.61

04/01/03	Washed Sand	1072.89	5122.50
04/01/03	Washed Sand	1024.51	6147.01
04/01/03	Washed Sand	1329.92	7476.93
04/01/03	Washed Sand	1294.20	8771.13
04/02/03	Washed Sand	1487.19	10258.32
04/03/03	Washed Sand	1810.20	12068.52
04/04/03	Washed Sand	31.42	12099.94
09/26/02	Pit Sand	471.76	471.76
09/27/02	Pit Sand	640.24	1112.00
09/28/02	Pit Sand	771.06	1883.06
10/04/02	Pit Sand	1010.76	2893.82
10/05/02	Pit Sand	1222.72	4116.54
10/08/02	Pit Sand	71.56	4188.10
10/09/02	Pit Sand	91.50	4279.60
10/10/02	Pit Sand	89.07	4368.67
10/11/02	Pit Sand	119.51	4488.18
10/14/02	Pit Sand	99.81	4587.99
10/15/02	Pit Sand	120.76	4708.75
10/16/02	Pit Sand	120.76	4829.51
10/17/02	Pit Sand	30.17	4859.68
12/05/02	Pit Sand	252.42	5112.10
12/06/02	Pit Sand	408.83	5520.93
12/09/02	Pit Sand	538.98	6059.91
12/10/02	Pit Sand	401.63	6461.54
12/11/02	Pit Sand	795.10	7256.64
12/12/02	Pit Sand	803.53	8060.17
12/13/02	Pit Sand	503.29	8563.46
12/16/02	Pit Sand	135.53	8698.99
01/02/03	Pit Sand	30.30	8729.29
01/03/03	Pit Sand	656.17	9385.46
01/06/03	Pit Sand	1048.48	10433.94
01/07/03	Pit Sand	294.29	10728.23
01/08/03	Pit Sand	209.62	10937.85
01/09/03	Pit Sand	604.89	11542.74
01/10/03	Pit Sand	647.98	12190.72
01/13/03	Pit Sand	328.95	12519.67
01/14/03	Pit Sand	383.08	12902.75
01/15/03	Pit Sand	150.45	13053.20
01/16/03	Pit Sand	504.68	13557.88
01/17/03	Pit Sand	857.26	14415.14
01/20/03	Pit Sand	1335.31	15750.45

01/21/03	Pit Sand	1042.54	16792.99
01/23/03	Pit Sand	32.81	16825.80
01/27/03	Pit Sand	59.37	16885.17
01/28/03	Pit Sand	159.83	17045.00
01/29/03	Pit Sand	122.11	17167.11
01/30/03	Pit Sand	816.85	17983.96
01/31/03	Pit Sand	707.14	18691.10
02/03/03	Pit Sand	797.12	19488.22
02/04/03	Pit Sand	1207.69	20695.91
02/05/03	Pit Sand	751.57	21447.48
02/06/03	Pit Sand	958.87	22406.35
02/07/03	Pit Sand	928.37	23334.72
02/10/03	Pit Sand	878.54	24213.26
02/11/03	Pit Sand	1181.53	25394.79
02/12/03	Pit Sand	1155.44	26550.23
02/13/03	Pit Sand	969.35	27519.58
02/14/03	Pit Sand	747.50	28267.08
02/17/03	Pit Sand	1055.15	29322.23
02/18/03	Pit Sand	1352.36	30674.59
02/19/03	Pit Sand	1285.45	31960.04
02/20/03	Pit Sand	90.03	32050.07
02/21/03	Pit Sand	93.22	32143.29
02/24/03	Pit Sand	1126.27	33269.56
02/25/03	Pit Sand	909.19	34178.75
02/26/03	Pit Sand	1028.88	35207.63
02/27/03	Pit Sand	1504.10	36711.73
02/28/03	Pit Sand	1175.61	37887.34
03/03/03	Pit Sand	1346.11	39233.45
03/04/03	Pit Sand	400.66	39634.11
03/05/03	Pit Sand	430.72	40064.83
03/06/03	Pit Sand	676.44	40741.27
03/15/03	Pit Sand	1344.99	42086.26
03/17/03	Pit Sand	1499.86	43586.12
03/18/03	Pit Sand	819.36	44405.48
03/19/03	Pit Sand	640.06	45045.54
03/20/03	Pit Sand	153.95	45199.49
03/21/03	Pit Sand	723.20	45922.69
04/04/03	Pit Sand	1730.82	47653.51

Updated 6/4

SUMMARY REPORT
COMPACTION TESTING
Unocal Edmonds Terminal
HWA Job No. 2002-156-23

Prepared for
Maul Foster & Alongi, Inc.

May 22, 2003

HWA GEOSCIENCES INC.
- *Geotechnical Engineering*
- *Hydrogeology*
- *Geoenvironmental Services*
- *Inspection & Testing*

HWA GEOSCIENCES INC.
Geotechnical Engineering • Hydrogeology • Geoenvironmental Services • Inspection & Testing

CELEBRATING 25 YEARS 1978-2003

May 22, 2003
HWA Project No. 2002-156-23

Maul Foster & Alongi, Inc.
17171 Bothell Way NE, #264
Seattle, Washington 98155

Attention: Linda Dawson

Subject: **SUMMARY REPORT – COMPACTION TESTING**
Unocal Edmonds Terminal
Your Project 9077.01.07/4
Edmonds, Washington

Dear Ms. Dawson:

As requested, HWA GEOSCIENCES INC (HWA) has performed periodic quality assurance testing to assess the compaction of fill materials placed within Basin excavations on this project. Field compaction tests were carried out periodically on a 'call out' basis. Full time monitoring of fill placement was not provided. Specific details of the testing carried out are provided on the attached Field Reports (Report No.s 1 to 4).

At the clients request, compaction test results were based on a Proctor value established by AAR Testing (the contractors QC laboratory). A copy of the AAR testing 'Compaction Test Report' is attached for reference. HWA carried out a confirmatory one-point Proctor test (see Figure 1).

To the best of our knowledge, all locations tested were in accordance with the project requirements. To our knowledge there are no outstanding deficiencies.

We appreciate the opportunity to be of service on this project. Should you have any additional requirements, please contact our office.

19730 - 64th Avenue W.
Suite 200
Lynnwood, WA 98036.5957

Tel: 425.774.0106
Fax: 425.774.2714
www.hwageosciences.com

Sincerely,

HWA GEOSCIENCES INC.

Richard McKinley
Manager, Lab and Inspection Group

RWM:PJP:rwm

COMPACTION TEST REPORT

Curve No.: 011

Project No.: 03-100 **Date:** 1/10/03

Project: Unical Edmonds

Location:

Elev./Depth: **Sample No.** 1 of 2

Remarks: tested/calculated by m.holtz
reviewed by a. hale

MATERIAL DESCRIPTION

Description: fine silty sand w/ minimal agg

Classifications - **USCS:** **AASHTO:**

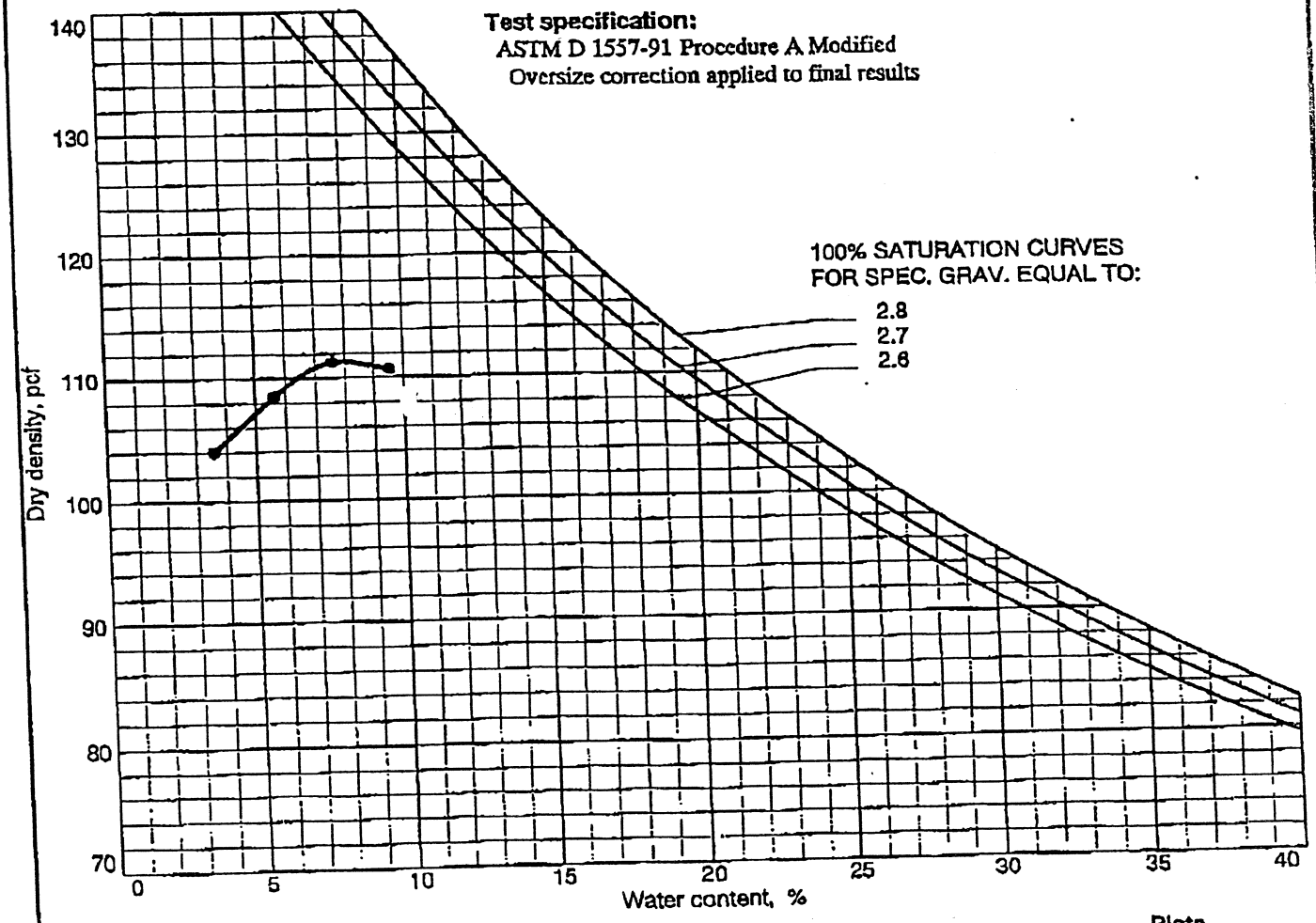
Nat. Moist. = **Sp.G. =** 2.64

Liquid Limit = **Plasticity Index =**

% > No.4 = 3.0 % **% < No.200 =** 0.0 %

TEST RESULTS
Maximum dry density = 112.4 pcf
Optimum moisture = 7.6 %

Test specification:
ASTM D 1557-91 Procedure A Modified
Oversize correction applied to final results



Plate

A.A.R. Testing Laboratory, Inc.

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

(ASTM D 698, ASTM D 1557, ASTM D 4718)

HWA GEOSCIENCES INC.

CLIENT: *Maul Foster and Alongi, Inc.*

PROJECT: *Unocal Edmonds Terminal* SAMPLE ID: *S-1*

PROJECT NO: *2002-156-23* Sampled By: *HWA/J.C.* Tested By: *E.B.*

Date Sampled: *2/14/2003* Date Received: *2/4/2003* Date Tested: *2/15/2003*

MATERIAL TYPE OR DESCRIPTION: ***fine grained SAND***

SAMPLE LOCATION AND DEPTH:

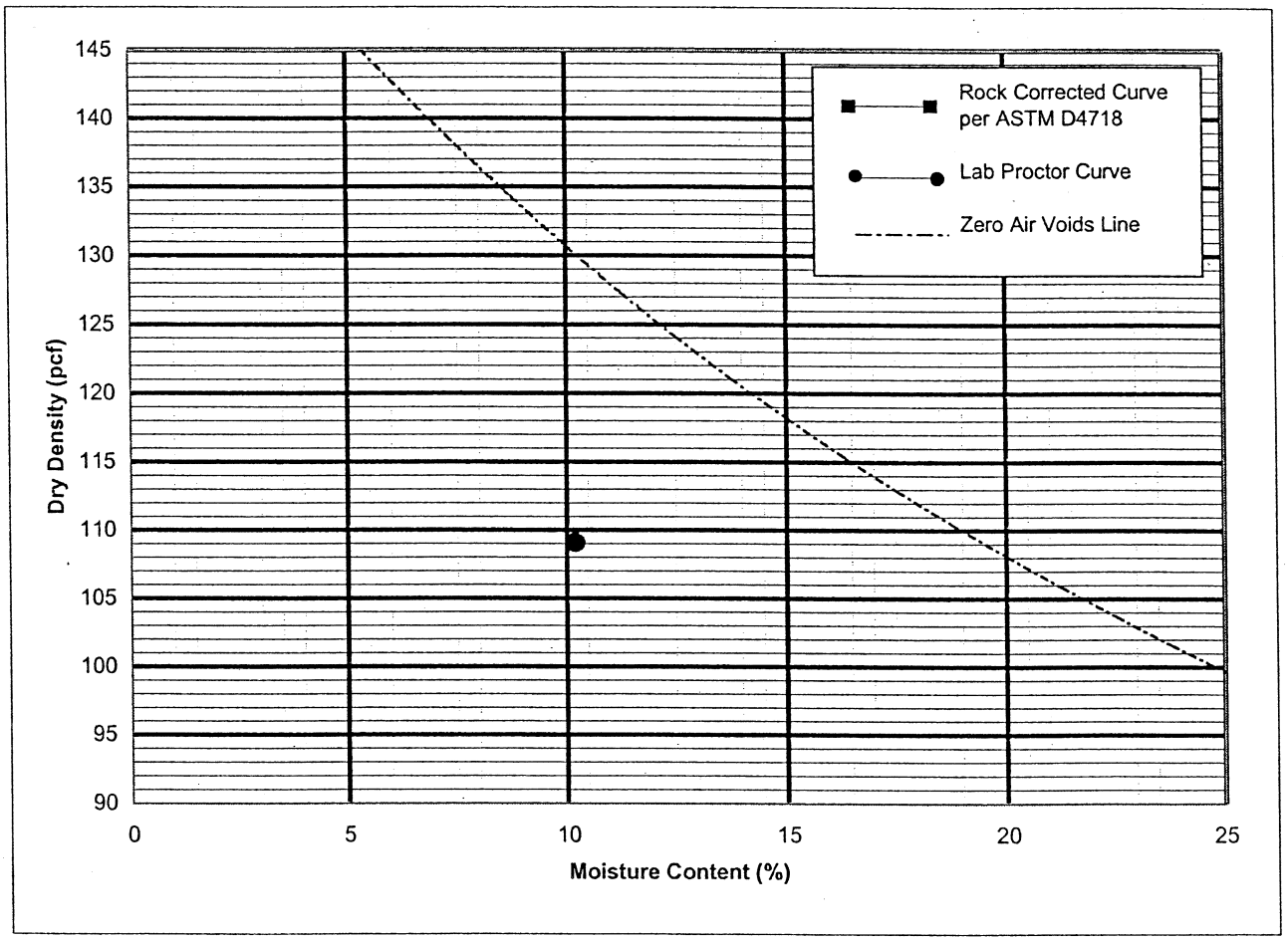
COMMENTS: ***one point Proctor to confirm values provided by Contractors QC testing; point matches with AAR Testing Laboratory's Curve No. 11***

Standard: ☐ D698 ☒ D1557 Natural Moisture Content: *10.2* %

Method: ☐ A ☐ B ☒ C Oversize: *0* % retained on: *3/4* in.

Preparation: ☐ Dry ☒ Moist Rammer: ☒ Auto ☐ Manual Assumed S.G.: *2.65*

Test Data					
Dry Density (pcf)	109.1				
Moisture Content (%)	10.2				



Data Summary*	
Percent Oversize	<5%
Max. Dry Density (pcf)*	112.4
Optimum Moisture (%)*	7.6

Test Values At Other Oversize Percentages						
0.0%	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%
112.4	114.2	116.1	118.1	120.1	122.2	124.4
7.6	7.3	6.9	6.6	6.3	6.0	5.6

* values corrected for oversize material per ASTM D4718, using assumed Specific Gravity shown and oversize moisture content of 1%

Reviewed By: _____ FIGURE 1

FIELD REPORT

HWA GEOSCIENCES INC.
19730-64th Avenue West
Lynnwood, WA 98036
Tel. 425-774-0106
Fax. 425-774-2714

Job No. 2002-156-23	Page No. 1 of 2
Report No. 001	Date February 12, 2003

Project Name: Unocal Edmonds Terminal	Location or Address: Edmonds, WA	Day of the Week: Wednesday
Owner: Unocal	Permit No.	Weather: Foggy Temp. (F): 40^0
Client: Maul Foster & Alongi, Inc	Client Rep.: Linda Dawson	HWA Project Engineer: Richard McKinley
Contractor: Wyser Construction	Contractor Rep.: Dan Reynolds	HWA Field Rep.: John H. (Jack) Carlock

WE NOTED THE FOLLOWING: (Contractor Activities, HWA Activities, Outstanding Issues, and Resolutions)

Start Travel: 08:50 Arrived at Site: 09:05 Departed Site: 11:50 End Travel: 12:00

Jack Carlock on site at the request of Linda Dawson to provide periodic quality assurance testing of compaction of the fine-grained sand being placed as backfill in Basins (excavations at former tank sites).

Backfill of the basins is being carried out using imported fine-grained sand placed in allowable maximum lifts of 2' thickness. Specified minimum compaction requirements are 90% of Modified Proctor (ASTM D1557), increasing to 95% of Modified Proctor for the uppermost 2' of fill. A.A.R. Testing Laboratory, Inc is providing quality control testing for the contractor and their field representative was on site at the time of our visit. Compaction test results were based on a proctor value established for the fill materials by A.A.R. Testing Laboratory (Curve #11).

Basin 1749

It is understood that six lifts of fine-grained sand fill had been placed and compacted prior to our arrival. At the time of testing, the fill was 1' below final grade. HWA perform three field density tests in the southern portion of the basin (tests 1 to 3 on page two). Testing indicated compaction meeting the specified minimum requirement of 95 % of Modified Proctor.

HWA observed the placement and compaction of the final lift, consisting of approximately 50 cubic yards of sand. HWA performed three nuclear field density tests in this area (tests 4 to 6 on page two). Testing indicated compaction meeting the specified minimum requirement of 95 % of Modified Proctor.

Basin 2604

It is our understanding that the backfill of this basin had only just begun (first lift). The fill in Basin 2604 appeared to have a higher fines content and have a higher percentage of rock visible than material placed in Basin 1749. HWA perform three nuclear field density tests along an axis running from the northeastern to the southwestern corners of this basin (tests 6 to 9 on page two). Testing indicated compaction meeting the specified minimum requirement of 90 % of Modified Proctor.

HWA returned a five-gallon bucket of the sand to our laboratory for confirmatory Proctor testing.

Compaction testing for this project has been requested on a call-out basis only. Full time inspection of fill placement or compaction was not requested or provided. A compaction test provides data only for a specific test location and only for the limited depth of the test. Achieving the specified degree of compaction for all project materials remains the responsibility of the contractor.

Signed: J. H. Carlock

Reviewed: R. McKinley

FIELD DENSITY TEST REPORT - NUCLEAR METHOD

[X] ASTM D 2922 and ASTM D 3017 [ ] AASHTO T238 and AASHTO T239 [ ] WSDOT TM7

HWA GEOSCIENCES INC.

CLIENT: *Maul Foster & Alongi, Inc.* PROJECT NO.: *2002156-23* DATE: *2.12.03*

PROJECT: *Unocal Edmonds Terminal* MATERIAL BEING PLACED: *Fine Sand*

PROJECT IMPROVEMENT TESTED: *Backfill of Basins 1749 and 2604*

Test No.	Detailed Test Location	Elev. or Depth (ft)	Probe Depth (in)	Over-Size (%)	Lab Control* (Proctor Information) Sample I.D.	Density (pcf) / Moisture%	Field Values Wet Dens (pcf) / Moisture (pcf)	Dry Dens (pcf) / Moisture%	Relative Compaction Field %	Spec %
1	*Basin 1749, 20' north of south face of basin, 15' northwest of face of the southeast corner of the basin. Sixth lift.*	*1'*	*8"*	*0*	*Curve #011*	*112.4 / 7.6*	*123.9 / 12.2*	*111.7 / 10.9*	***99***	*95*
2	*Basin 1749, 15' north of south face of basin, 45' west of face of the southeast corner of the basin. Sixth lift.*	*1'*	*8"*	*0*	*Curve #011*	*112.4 / 7.6*	*121.4 / 12.0*	*109.4 / 11.0*	***97***	*95*
3	*Basin 1749, 18' north of south face of basin, 55' west of face of the southeast corner of the basin. Sixth lift.*	*1'*	*8"*	*0*	*Curve #011*	*112.4 / 7.6*	*121.0 / 11.4*	*109.6 / 10.4*	***98***	*95*
4	*Basin 1749, 15' north of south face of basin, 15' northwest of face of the southeast corner of the basin. Seventh lift.*	*Grade*	*8"*	*0*	*Curve #011*	*112.4 / 7.6*	*121.3 / 12.1*	*109.2 / 11.1*	***97***	*95*
5	*Basin 1749, 15' north of south face of basin, 40' northwest of face of the southeast corner of the basin. Seventh lift.*	*Grade*	*8"*	*0*	*Curve #011*	*112.4 / 7.6*	*118.6 / 11.5*	*107.1 / 10.7*	***95***	*95*
6	*Basin 1749, 15' north of south face of basin, 50' northwest of face of the southeast corner of the basin. Seventh lift.*	*Grade*	*8"*	*0*	*Curve #011*	*112.4 / 7.6*	*122.1 / 12.1*	*110.0 / 11.0*	***98***	*95*
7	*Basin 2604, 40' north of toe of the ramp. First lift*	*12'*	*8"*	*0*	*Curve #011*	*112.4 / 7.6*	*118.9 / 12.7*	*106.2 / 12.0*	***94***	*90*
8	*Basin 2604, center of the basin. First lift.*	*12'*	*8"*	*0*	*Curve #011*	*112.4 / 7.6*	*129.9 / 14.0*	*115.9 / 12.1*	***103***	*90*
9	*Basin 2604, 45' northeast of southwest corner of basin. First lift.*	*12'*	*8"*	*0*	*Curve #011*	*112.4 / 7.6*	*120.2 / 13.1*	*107.1 / 12.2*	***95***	*90*

Densometer: [X] Troxler 3411-B [ ] CPN MC1-DR-P [ ] Other _____ Serial #: 12216 Dens. Stnd.: 2799 Moist. Stnd: 671

*Lab Control: [ ] ASTM D698, Standard Proctor [X] ASTM D 1557, Modified Proctor

[ ] AASHTO T-99, Standard Proctor [ ] AASHTO T-180, Modified Proctor

COMMENTS: *Moisture/Density Value established by A.A.R. Testing Laboratory, Inc. Elevations and locations are approximate.*

Completed By: John H. (Jack) Carlock Reviewed By: _____

Revised 7/01

FIELD REPORT

HWA GEOSCIENCES INC.
19730-64th Avenue West
Lynnwood, WA 98036
Tel. 425-774-0106
Fax. 425-774-2714

Job No.	Page No.
2002-156-23	1 of 3
Report No.	Date
002	February 24, 2003

Project Name	Location or Address	Day of the Week
Unocal Edmonds Terminal	Edmonds, WA	Monday
Owner	Permit No.	Weather / Temp. (F)
Unocal		Sunny 35^0
Client	Client Rep.	HWA Project Engineer
Maul Foster & Alongi, Inc	Linda Dawson	Richard McKinley
Contractor	Contractor Rep.	HWA Field Rep.
Wyser Construction	Dan Reynolds	John H. (Jack) Carlock

WE NOTED THE FOLLOWING: (Contractor Activities, HWA Activities, Outstanding Issues, and Resolutions)

Start Travel: 07:50 Arrived at Site: 08:00 Departed Site: 10:50 End Travel: 11:00

Jack Carlock on site at the request of Linda Dawson to provide periodic quality assurance testing of compaction of the fine-grained sand being placed as backfill in Basins (excavations at former tank sites).

Backfill of the basins is being carried out using imported fine-grained sand placed in allowable maximum lifts of 2' thickness. Specified minimum compaction requirements are 90% of Modified Proctor (ASTM D1557), increasing to 95% of Modified Proctor for the uppermost 2' of fill. A.A.R. Testing Laboratory, Inc is providing quality control testing for the contractor and their field representative was on site at the time of our visit. Compaction test results were based on a proctor value established for the fill materials by A.A.R. Testing Laboratory (Curve #11).

Basin 263

It is our understanding that finished grade of the sand fill will equal the elevation of the catch basin located in the northeastern quadrant of Basin 263. It was observed that in the northern two thirds of Basin 263, sand fill had been placed and compacted to approximately 0.5 feet below grade. Placement and compaction of the sand in the southern third of the basin was completed to 3.5 to 4.0 feet below grade. HWA performed four field density tests in this basin. See tests 1 to 4 on page three of this report for locations and test values. Testing indicated compaction meeting the specified minimum requirements. It is our understanding that placement and compaction of fill will continue later today.

Basin 2604

It is our understanding that the bulk of the sand fill within this basin is approximately 4' to 6' below proposed grade. HWA performed two nuclear field density tests and testing indicated that compaction of the material met the specified minimum requirements. See test numbers 5 and 6 on page three.

The area immediately adjacent to the catch basin located in the central southern portion of the basin is approximately 1 feet below grade. HWA performed one nuclear field density test and testing indicated that compaction of the material failed to meet the specified minimum requirements of 95% of Modified Proctor. See test number 7 on page three. Tests results were discussed and compared with A.A.R. Testing Laboratory's Technician on site. It is our understanding that the failed test was confirmed by A.A.R. Testing Laboratory. We further understand that directions for recompaction of the material at this location were given to the contractor by A.A.R. Testing Laboratory.

Signed: J. H. Carlock

Reviewed:

Basin 2914

It was observed that the fill sand within Basin 2914 had been placed and compacted to approximately 4' below proposed grade of sand. HWA perform two nuclear field density tests in this basin. Testing indicated compaction meeting the specified minimum requirements of 90 % of Modified Proctor. (See test numbers 8 and 9 on page three).

Compaction testing for this project has been requested on a call-out basis only. Full time inspection of fill placement or compaction was not requested or provided. A compaction test provides data only for a specific test location and only for the limited depth of the test. Achieving the specified degree of compaction for all project materials remains the responsibility of the contractor.

Signed: _____

Reviewed: _____

FIELD DENSITY TEST REPORT - NUCLEAR METHOD

[X] ASTM D 2922 and ASTM D 3017 [ ] AASHTO T238 and AASHTO T239 [ ] WSDOT TM7

HWA GEOSCIENCES INC.

CLIENT: *Maul Foster & Alongi, Inc.* PROJECT NO.: *2002156-23* DATE: *2.24.03*

PROJECT: *Unocal Edmonds Terminal* MATERIAL BEING PLACED: *Fine Sand*

PROJECT IMPROVEMENT TESTED: *Backfill of Basins 263, 2604, and 2914*

Test No.	Detailed Test Location	Elev. or Depth (ft)	Probe Depth (in)	Over-Size (%)	Lab Control* (Proctor Information) Sample I.D.	Density (pcf) / Moisture%	Field Values Wet Dens (pcf) / Moisture (pcf)	Dry Dens (pcf) / Moisture%	Relative Compaction Field %	Spec %
1	Basin 236, SE Quadrant, 20' north of south face of basin.	Grade - 4ft	8"	0	Curve #011	112.4 / 7.6	111.5 / 8.9	102.6 / 8.7	**91**	90
2	Basin 236, SW Quadrant, 20' north of south face of basin.	Grade - 4ft	8"	0	Curve #011	112.4 / 7.6	115.3 / 9.6	105.7 / 9.1	**94**	90
3	Basin 236, NW Quadrant, 30' east of west face of basin.	Grade	8"	0	Curve #011	112.4 / 7.6	116.0 / 9.5	106.5 / 8.9	**95**	95
4	Basin 236, NE Quadrant, 10' north of catch basin.	Grade	8"	0	Curve #011	112.4 / 7.6	115.8 / 9.5	106.3 / 8.9	**95**	95
5	Basin 2604, center of NW Quadrant, 10' south of north face of basin.	Grade - 6ft	8"	0	Curve #011	112.4 / 7.6	115.2 / 9.6	105.6 / 9.1	**94**	90
6	Basin 2604, Center of Basin.	Grade - 6ft	8"	0	Curve #011	112.4 / 7.6	113.2 / 9.1	104.1 / 8.7	**93**	90
7	Basin 2604, approximate boundary between the southern quadrants, 10' northeast of catch basin	Grade - 1ft	8"	0	Curve #011	112.4 / 7.6	113.2 / 8.9	104.3 / 8.5	**93**	95
8	Basin 2914, Center of Basin.	Grade - 4ft	8"	0	Curve #011	112.4 / 7.6	125.3 / 14.7	110.6 / 13.3	**98**	90
9	Basin 2914, Center of Basin. 3' west of Test Point #7	Grade - 4ft	8"	0	Curve #011	112.4 / 7.6	121.8 / 13.8	108.0 / 12.8	**96**	90

Densometer: [X] Troxler 3411-B [ ] CPN MC1-DR-P [ ] Other _____ Serial #: 12216 Dens. Stnd.: 2799 Moist. Stnd: 671

*Lab Control: [ ] ASTM D698, Standard Proctor [X] ASTM D 1557, Modified Proctor [ ] AASHTO T-99, Standard Proctor [ ] AASHTO T-180, Modified Proctor

COMMENTS: *Moisture/Density Value established by A.A.R. Testing Laboratory, Inc. Elevations and locations are approximate.*

Completed By: John H. (Jack) Carlock Reviewed By: _____

FIELD REPORT

HWA GEOSCIENCES INC.
19730-64th Avenue West
Lynnwood, WA 98036
Tel. 425-774-0106
Fax. 425-774-2714

Job No.	Page No.
2002-156-23	1 of 3
Report No.	Date
003	February 27, 2003

Project Name	Location or Address	Day of the Week
Unocal Edmonds Terminal	Edmonds, WA	Thursday
Owner	Permit No.	Weather / Temp. (F)
Unocal		Sunny 50^0
Client	Client Rep.	HWA Project Engineer
Maul Foster & Alongi, Inc	Linda Dawson	Richard McKinley
Contractor	Contractor Rep.	HWA Field Rep.
Wyser Construction	Dan Reynolds	John H. (Jack) Carlock

WE NOTED THE FOLLOWING: (Contractor Activities, HWA Activities, Outstanding Issues, and Resolutions)

Start Travel: 09:50 Arrived at Site: 10:00 Departed Site: 11:20 End Travel: 11:30

Jack Carlock on site at the request of Linda Dawson to provide periodic quality assurance testing of compaction of the fine-grained sand being placed as backfill in Basins (excavations at former tank sites).

Backfill of the basins is being carried out using imported fine-grained sand placed in allowable maximum lifts of 2' thickness. Specified minimum compaction requirements are 90% of Modified Proctor (ASTM D1557), increasing to 95% of Modified Proctor for the uppermost 2' of fill. A.A.R. Testing Laboratory, Inc is providing quality control testing for the contractor and their field representative was on site at the time our visit was ending. Compaction test results were based on a proctor value established for the fill materials by A.A.R. Testing Laboratory (Curve #11).

Basin 263

It is our understanding that finished grade of the sand fill will equal the elevation of the catch basin located in the northeastern quadrant of Basin 263. It was observed that in the northern two thirds of Basin 263, a fine-grained sand fill had been placed and compacted to the elevation of grade of sand minus approximately 0.5 feet. Placement and compaction of the sand in the southern third of this basin remained 3.5 to 4.0 feet below proposed grade of sand. The elevations at which today's tests were performed mirror those of the testing performed during our previous visit to the site (see HWA Field Report #002). It is our understanding that no new sand fill has been placed in this basin since our previous visit, but the sand had been subjected to further compaction efforts.

HWA performed two field density tests in this basin. (See tests 1 and 2 on page three of this report for locations and test values.) Testing indicated compaction meeting the specified minimum requirement 95 % of Modified Proctor.

Basin 2911

It is our understanding that backfill operation had just begun in Basin 2911, and that the bulk of the sand fill within this basin is approximately 6' below grade.

HWA perform three nuclear field density tests within this basin. Testing indicated that compaction of the sand fill met the specified minimum requirement.. (See test numbers 3 to 5 page three).

Signed: _____

Reviewed: _____

Compaction testing for this project has been requested on a call-out basis only. Full time inspection of fill placement or compaction was not requested or provided. A compaction test provides data only for a specific test location and only for the limited depth of the test. Achieving the specified degree of compaction for all project materials remains the responsibility of the contractor.

Signed: _____

Reviewed: _____

FIELD DENSITY TEST REPORT - NUCLEAR METHOD

[X] ASTM D 2922 and ASTM D 3017 [ ] AASHTO T238 and AASHTO T239 [ ] WSDOT TM7

HWA GEOSCIENCES INC.

CLIENT: *Maul Foster & Alongi, Inc.* PROJECT NO.: *2002156-23* DATE: *2.27.03*

PROJECT: *Unocal Edmonds Terminal* MATERIAL BEING PLACED: *Fine Sand*

PROJECT IMPROVEMENT TESTED: *Backfill of Basins 263 and 2911*

Test No.	Detailed Test Location	Elev. or Depth (ft)	Probe Depth (in)	Over-Size (%)	Lab Control* (Proctor Information) Sample I.D.	Density (pcf) / Moisture%	Field Values Wet Dens (pcf) / Moisture (pcf)	Dry Dens (pcf) / Moisture%	Relative Compaction Field %	Spec %
1	*Basin 236, SE Quadrant, 70' southeast of Catch Basin located in the northwestern quadrent of the basin.*	*Grade - 4ft*	*8"*	*0*	*Curve #011*	*112.4* / *7.6*	*118.4* / *10.5*	*107.9* / *9.7*	***96***	*95*
2	*Basin 236, SW Quadrant, 40' south of Catch Basin located in the northeastern quadrant of the basin.*	*Grade - 4ft*	*8"*	*0*	*Curve #011*	*112.4* / *7.6*	*116.7* / *9.7*	*107.0* / *9.1*	***95***	*95*
3	*Basin 2911, SE Quadrant, First Lift.*	*Grade - 6ft*	*8"*	*0*	*Curve #011*	*112.4* / *7.6*	*113.5* / *10.3*	*103.2* / *10.0*	***90***	*90*
4	*Basin 2911, NW Quadrant, 30' south of retaining wall, First Lift.*	*Grade - 6ft*	*8"*	*0*	*Curve #011*	*112.4* / *7.6*	*118.4* / *10.3*	*108.1* / *9.5*	***96***	*90*
5	*Basin 2911, NE Quadrant, 45' south of SW corner of retaining wall, First Lift.*	*Grade - 6ft*	*8"*	*0*	*Curve #011*	*112.4* / *7.6*	*120.4* / *10.2*	*110.2* / *9.3*	***98***	*90*

Densometer: [X] Troxler 3411-B [ ] CPN MC1-DR-P [ ] Other _____ Serial #: 12216 Dens. Stnd.: 2815 Moist. Stnd: 673

*Lab Control: [ ] ASTM D698, Standard Proctor [X] ASTM D 1557, Modified Proctor

[ ] AASHTO T-99, Standard Proctor [ ] AASHTO T-180, Modified Proctor

COMMENTS: *Moisture/Density Value established by A.A.R. Testing Laboratory, Inc. Elevations and locations are approximate.*

Completed By: John H. (Jack) Carlock Reviewed By: _____

FIELD REPORT

HWA GEOSCIENCES INC.
19730-64th Avenue West
Lynnwood, WA 98036
Tel. 425-774-0106
Fax. 425-774-2714

Job No. 2002-156-23	Page No. 1 of 3
Report No. 004	Date May 21, 2003

Project Name: Unocal Edmonds Terminal	Location or Address: Edmonds, WA	Day of the Week: Wednesday
Owner: Unocal	Permit No.	Weather: Sunny Temp. (F): 50^0
Client: Maul Foster & Alongi, Inc	Client Rep.: Linda Dawson	HWA Project Engineer: Richard McKinley
Contractor: Wyser Construction	Contractor Rep.: Dan Reynolds	HWA Field Rep.: John H. (Jack) Carlock

WE NOTED THE FOLLOWING: (Contractor Activities, HWA Activities, Outstanding Issues, and Resolutions)

Start Travel: 07:50 Arrived at Site: 08:00 Departed Site: 09:45 End Travel: 10:00

Jack Carlock on site at the request of Linda Dawson to provide periodic quality assurance testing of compaction of the fine-grained sand being placed as backfill in Basins (excavations at former tank sites).

Backfill of the basins is being carried out using imported fine-grained sand placed in allowable maximum lifts of 2' thickness. Specified minimum compaction requirements are 90% of Modified Proctor (ASTM D1557), increasing to 95% of Modified Proctor for the uppermost 2' of fill. A.A.R. Testing Laboratory, Inc is providing quality control testing for the contractor and their field representative was on site at the time our visit was ending. Compaction test results were based on a proctor value established for the fill materials by A.A.R. Testing Laboratory (Curve #11).

ASWL #3

It is our understanding that the sand fill had been placed and compacted to finished grade. It was observed that an indeterminable amount of the low permeability capping material (Woodway Soil) had been (inadvertently) mixed with the fill sand in some areas of this basin. Generally, the fill sand appeared to be well compacted.

HWA performed one field density tests in this basin. (See test 1 on page three of this report for location and test values.) Testing indicated compaction meeting the specified minimum requirement 95 % of Modified Proctor.

Basin 2910

It is our understanding that the sand fill had been placed finished grade. It was observed that an indeterminable amount of what appeared to be 2 to 4 inch-crushed rock was mixed in with the fill sand. It is our understanding that a layer of this rock had been placed near the finished grade of the sand. Compaction efforts within this basin were still underway during our visit. Generally, the fill sand appeared to be well compacted.

After performing several nuclear field density tests that were unduly influenced by the inclusion of the 2" to 4" rock, HWA located rock free areas in which to test. Two nuclear field density tests were performed within this basin. Testing indicated that compaction of the sand fill met the specified minimum requirement. (See test numbers 2 and 3 on page three).

Signed: _____

Reviewed: _____

Basin 2911

It is our understanding that the sand fill had been placed and compacted to finished grade. Generally, the fill sand appeared to be well compacted.

HWA perform two nuclear field density tests within this basin. Testing indicated that compaction of the sand fill met the specified minimum requirement. (See test numbers 4 and 5 on page three).

Compaction testing for this project has been requested on a call-out basis only. Full time inspection of fill placement or compaction was not requested or provided. A compaction test provides data only for a specific test location and only for the limited depth of the test. Achieving the specified degree of compaction for all project materials remains the responsibility of the contractor.

Signed:_____

Reviewed:_____

FIELD DENSITY TEST REPORT - NUCLEAR METHOD

[X] ASTM D 2922 and ASTM D 3017 [ ] AASHTO T238 and AASHTO T239 [ ] WSDOT TM7

HWA GEOSCIENCES INC.

CLIENT: *Maul Foster & Alongi, Inc.* PROJECT NO.: *2002156-23* DATE: *5.21.03*

PROJECT: *Unocal Edmonds Terminal* MATERIAL BEING PLACED: *Fine Sand*

PROJECT IMPROVEMENT TESTED: *Backfill of Basins 263 and 2911*

Test No.	Detailed Test Location	Elev. or Depth (ft)	Probe Depth (in)	Over-Size (%)	Lab Control* (Proctor Information) Sample I.D.	Density (pcf) / Moisture%	Field Values Wet Dens (pcf) / Moisture (pcf)	Dry Dens (pcf) / Moisture%	Relative Compaction Field %	Spec %
1	*ASWL #3, Center point of the basin.*	*At Grade*	*8"*	*3.0*	*Curve #011*	*112.4* / *7.6*	*123.9* / *11.8*	*112.1* / *10.5*	***99***	*95*
2	*Basin 2910, NW quadrant, 40' south of the retaining wall north of basin, 20' east of western edge of basin.*	*At Grade*	*8"*	*3.0*	*Curve #011*	*112.4* / *7.6*	*115.3* / *6.9*	*108.4* / *6.4*	***96***	*95*
3	*Basin 2911, NE quadrant, 30' south of the retaining wall north of basin, 25' west of eastern edge of basin.*	*At Grade*	*8"*	*3.0*	*Curve #011*	*112.4* / *7.6*	*115.4* / *6.4*	*109.0* / *5.9*	***97***	*90*
4	*Basin 2910, NW quadrant, 30' W of catch basin in the NE quadrant of retaining wall, First Lift.*	*At Grade*	*8"*	*3.0*	*Curve #011*	*112.4* / *7.6*	*114.6* / *7.5*	*107.1* / *7.0*	***95***	*90*
5	*Basin 2910, SE Quadrant, 45' south of catch basin in the NW quadrant of the basin.*	*At Grade*	*8"*	*3.0*	*Curve #011*	*112.4* / *7.6*	*114.7* / *7.1*	*107.6* / *6.6*	***96***	*90*

Densometer: [X] Troxler 3411-B [ ] CPN MC1-DR-P [ ] Other _____ Serial #: 18734 Dens. Stnd.: 2725 Moist. Stnd: 701

*Lab Control: [ ] ASTM D698, Standard Proctor [X] ASTM D 1557, Modified Proctor [ ] AASHTO T-99, Standard Proctor [ ] AASHTO T-180, Modified Proctor

COMMENTS: *Moisture/Density Value established by A.A.R. Testing Laboratory, Inc. Elevations and locations are approximate.*

Completed By: John H. (Jack) Carlock Reviewed By: _____

Rinker MATERIALS™

RECEIVED
JUN 10 2003
By

To: **Dan Reynolds**
Wyser Construction Company

Fr: **Kurt Siegfried/PG**
Rinker Materials Company

Re: **Backfill Materials for the**
UNOCAL Edmonds Bulk
Terminal Remediation Project

In regard to the backfill materials supplied by Rinker Materials please accept this letter as a certificate of non-contamination for all materials supplied to Wyser Construction for backfill at the UNOCAL Edmonds site. Specifically all, Course Washed Sand, Pit Sand, 3/4"& 1-1/4" Washed Rock and all 1-1/4" Base Course from our Everett Washington Pit were mined from a depth of approximately 35' below surface elevation from native undisturbed glacial outwash. All 2" Ballast Rock, 2"X 4" Crushed Stone and 4"X 8" Crushed Stone are mined from our Granite Falls Pit which is located in a remote rural area comprised of second growth forest land with no development within 7 miles.
Due to the depth of the aggregate source and nature of the surrounding sub-surface conditions at both the Everett site & Granite Falls site there is no possibility of petroleum hydrocarbon contamination.
Should you have any questions please do not hesitate to contact me.

Regards,

Kurt Siegfried- PG
Rinker Materials Company
Technical Services Dept.

State of Washington
398
Licensed Geologist
KURT T. SIEGFRIED

WYSER INC
CONSTRUCTION

6/05/03

Dr. Mark Brearley
Unocal Corporation
P.O. Box 399
Edmonds, WA. 98020

Re: Unocal Upper Yard Remediation
Maul Foster & Alongi, Inc Memo dated 6/3/03

Subject: Soil Source Identification Request: "King County/Ballinger Soils"

Dear Dr. Brearley:

The intent of this letter is to identify the "King County/Ballinger Soils" as requested in the attached referenced memo. The soil was excavated from our King County Housing Authority Ballinger Homes project, located at 2200 NE 201st Place Shoreline, Washington. Approximately 800 yards of gravel borrow was excavated from the Ballinger site and then placed at the Unocal site. The soils contained no organics or contamination and appeared to be adequate fill for the Edmonds site.

Should you require any additional information regarding this matter, please contact me at 425.742.0898. Thank You.

Sincerely,

WYSER CONSTRUCTION, INC.

Dan Reynolds
Sr. Project Coordinator

Cc Linda Dawson, Maul Foster & Alongi

HWA GEOSCIENCES INC.

19730-64TH AVE. W., SUITE 200
LYNNWOOD, WA 98036-5957
TEL. 425-774-0106
FAX. 425-774-2714
www.hwageosciences.com

TRANSMITTAL

TO: Maul Foster Alongi, Inc.
17171 Bothell Way NE, Suite 264
Seattle, Washington 98155

DATE: June 13, 2002

HWA PROJECT NO: 2002-101-22

ATTN: Ms. Linda Dawson

RE: Soil Stockpile Assessment, 22430 Dogwood Lane, Woodway, Washington

WE ARE SENDING YOU THE FOLLOWING ITEMS:

DATE	COPIES	DESCRIPTION
6/12/02	2	Soil Laboratory Testing Report

RECEIVED
JUN 17 2002
BY:

THESE ARE TRANSMITTED: ☐ FOR YOUR INFORMATION ☐ FOR ACTION SPECIFIED BELOW ☐ FOR REVIEW AND COMMENT ☒ AS REQUESTED

REMARKS

BY: C Fisk
Richard McKinley

TITLE: Manager, Lab Services Group

COPIES TO:

HWA GEOSCIENCES INC.
19730-64TH AVE. W., SUITE 200
LYNNWOOD, WA 98036-5957
TEL. 425-774-0106
FAX. 425-774-2714
www.hwageosciences.com

June 12, 2002
HWA Project No. 2002-101-22

Maul Foster Alongi, Inc.
17171 Bothell Way NE, Ste 264
Seattle, Washington 98155

Attention: Ms. Linda Dawson

Subject: **Soil Laboratory Testing Report**
Soil Stockpile Assessment
22430 Dogwood Lane, Woodway, WA

Dear Ms. Dawson:

In accordance with your request, HWA GeoSciences Inc. (HWA) performed laboratory testing for the above referenced project. Herein we present the results of our laboratory analyses, which are summarized on the attached reports, as well as a discussion of the suitability for use of this material as construction fill. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

BACKGROUND: It is understood that this material is under consideration for use as fill material at the Unocal site in Edmonds. Consequently, it was requested that we perform grain size analyses to characterize the material. A Modified Proctor test was carried out to assess the moisture-density relationship characteristics of the soil. The workscope for the testing program was developed in accordance with our discussions with the client.

SAMPLE INFORMATION: Four bulk samples were obtained from the subject stockpile on June 4, 2002, by Mr. Bernie McCarthy of HWA. The samples were designated as samples S-1, S-2, S-3, and S-4, and were taken from the NW, SW, SE, and NE quadrants of the stockpile respectively.

PARTICLE SIZE ANALYSIS OF SOILS: Each of the four samples was tested to determine the particle distribution of material retained above the #200 sieve, in general accordance with ASTM D422. The results are summarized on the attached Sieve Analysis of Soil

and Aggregate reports, which also provide information regarding the ASTM classification of the samples and the moisture contents at the time of testing.

LABORATORY COMPACTION CHARACTERISTICS OF SOIL (PROCTOR TEST): A composite of samples S-1, S-2 and S-3 was tested using method ASTM D 1557 (Modified Proctor). The test results are summarized on the attached Laboratory Compaction Characteristics of Soil report.

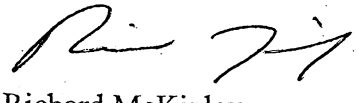
DISCUSSION: Based on the test results, the material in the stockpile material is classified as a silty sand (SM). Due to the high silt content, this material will be poorly draining, and should not be placed where free draining characteristics are required. Otherwise, the material is considered suitable for use as fill, including structural fill, provided that the required compaction can be achieved. Based on the test results, the moisture content of the material is currently about 1% to 2% above the optimum moisture for compaction, which is considered to be a suitable moisture content for compaction. We caution that this material is considered to be moisture sensitive, and that compaction to typical density requirements (i.e. 95% of Modified Proctor) will not likely be feasible at moisture contents greater than 3% above or below optimum. Consequently, placement of this material is not recommended during wet weather conditions.

CLOSURE: The testing described above was conducted utilizing generally accepted laboratory procedures. The conclusions presented above are based on the information from the four sample locations. Experience has shown that test values derived by these standard methods vary with each representative sample. In addition, it is typical for the engineering properties of soils to vary over small distances of lateral and vertical extent. HWA's knowledge of the stockpile is limited to the information from the sample locations, and we cannot be held responsible for undiscovered conditions within the pile. If a greater degree of certainty is required, additional testing can be performed.

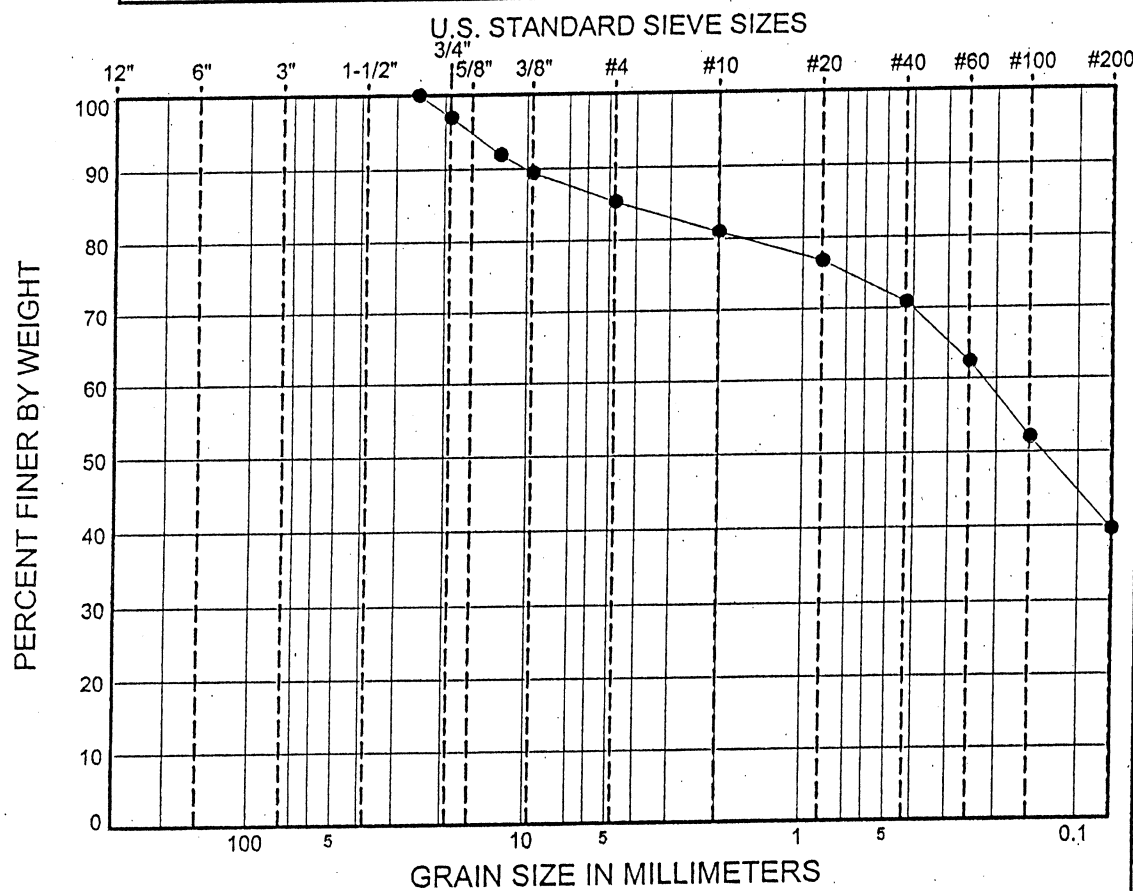
We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please contact our office.

Sincerely,

HWA GEOSCIENCES INC.



Richard McKinley
Manager, Materials & Construction Services Group
RM:rm



Sieve Size	Percent Passing	Specification Limits
8 Inch		
7 Inch		
6 Inch		
5 Inch		
4 Inch		
3 Inch		
2 1/2 Inch		
2 Inch		
1 1/2 Inch		
1 1/4 Inch		
1 Inch	100.0%	
3/4 Inch	96.9%	
5/8 Inch		
1/2 Inch	91.9%	
3/8 Inch	89.3%	
1/4 Inch		
No. 4	85.3%	
No. 8		
No. 10	81.0%	
No. 16		
No. 20	76.7%	
No. 30		
No. 40	70.8%	
No. 50		
No. 60	62.4%	
No. 80		
No. 100	52.1%	
No. 200	39.5%	

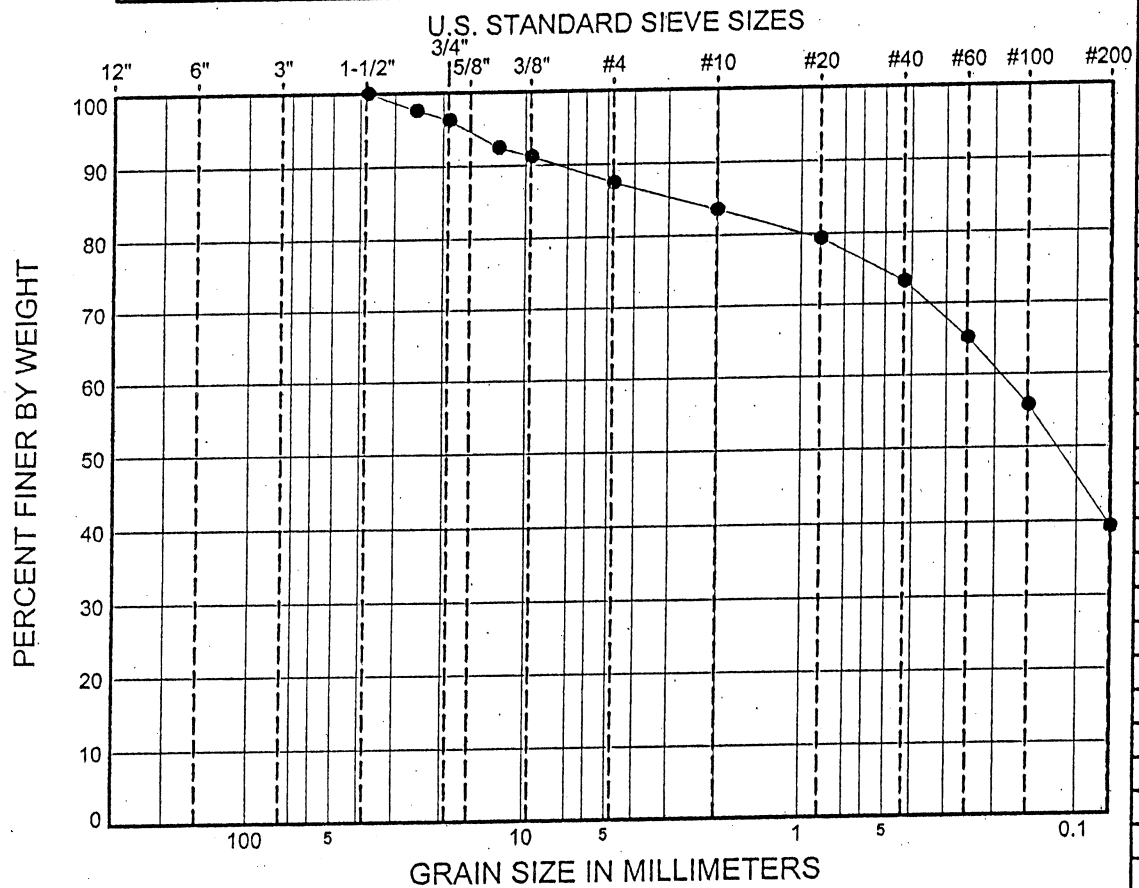
SAMPLE ID	DATE SAMPLED	SAMPLED FROM	MATERIAL CLASSIFICATION / DESCRIPTION	Moisture %	Sand Equiv.	L.A. Abrasn	Deg'n	Dust Ratio	Sound	P.I.	Fracture %
S-1	6/4/2002	NW Quadrant of Stockpile	(SM) grayish-brown, silty SAND	13.5							

HWA GEOSCIENCES INC.

Soil Stockpile Located At
22430 Dogwood Lane, Woodway, WA
Assessment for Potential Use As Backfill
Unocal Site, Edmonds

SIEVE ANALYSIS OF SOIL / AGGREGATE
Aggregates- ASTM C136
Soils-ASTM D422

PROJECT NO.: 2002-101-22 FIGURE: 1



Sieve Size	Percent Passing	Specification Limits
8 Inch		
7 Inch		
6 Inch		
5 Inch		
4 Inch		
3 Inch		
2 1/2 Inch		
2 Inch		
1 1/2 Inch	100.0%	
1 1/4 Inch		
1 Inch	97.6%	
3/4 Inch	96.3%	
5/8 Inch		
1/2 Inch	92.4%	
3/8 Inch	91.2%	
1/4 Inch		
No. 4	87.4%	
No. 8		
No. 10	83.5%	
No. 16		
No. 20	79.3%	
No. 30		
No. 40	73.2%	
No. 50		
No. 60	65.1%	
No. 80		
No. 100	55.7%	
No. 200	39.3%	

SAMPLE ID	DATE SAMPLED	SAMPLED FROM	MATERIAL CLASSIFICATION / DESCRIPTION	Moisture %	Sand Equiv.	L.A. Abrasn	Deg'n	Dust Ratio	Sound	P.I.	Fracture %
S-2	6/4/2002	SW Quadrant of Stockpile	(SM) dark-grayish-brown, silty SAND	13.8							

HWA GEOSCIENCES INC.

Soil Stockpile Located At
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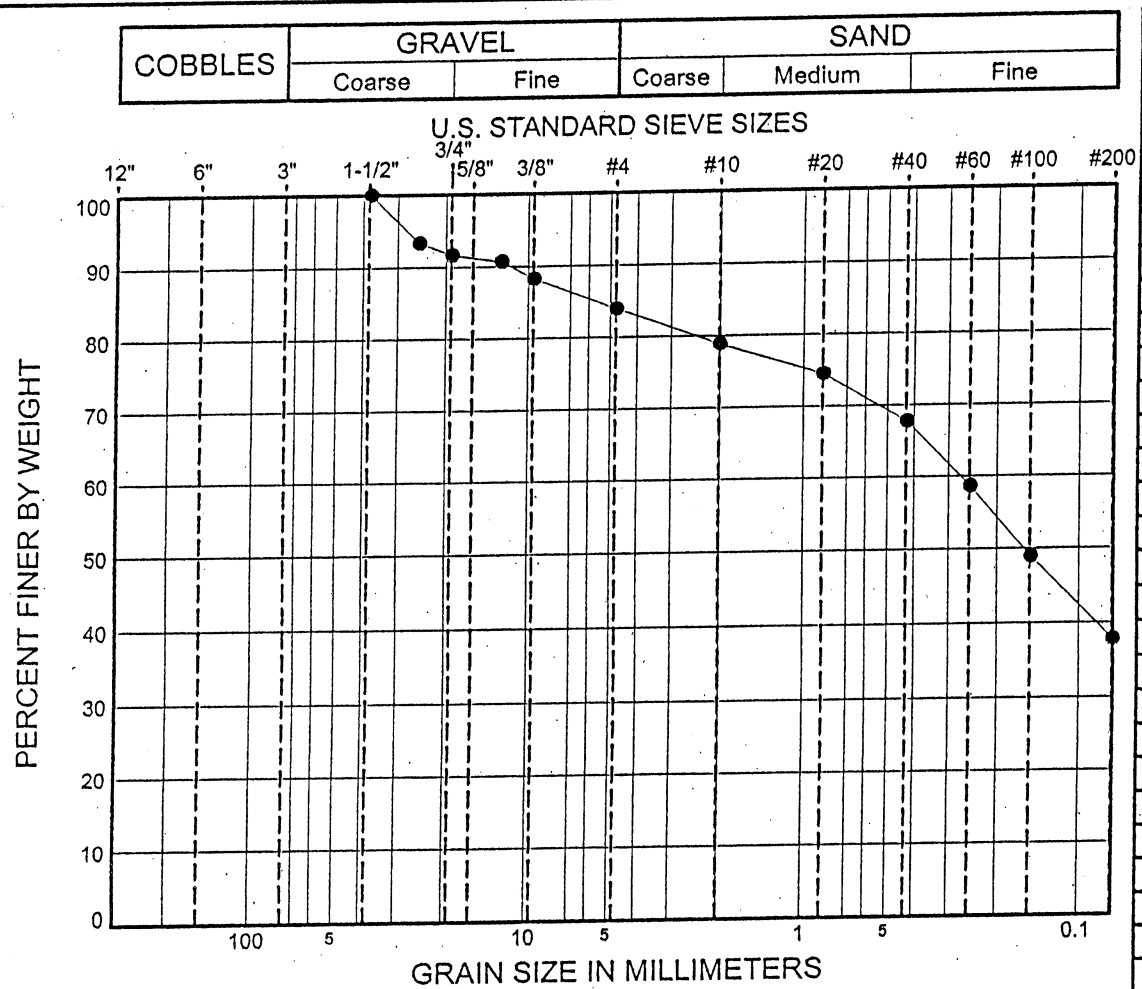
Assessment for Potential Use As Backfill
Unocal Site, Edmonds

SIEVE ANALYSIS OF SOIL / AGGREGATE
Aggregates- ASTM C136
Soils-ASTM D422

PROJECT NO.: 2002-101-22 FIGURE: 2



Sieve Size	Percent Passing	Specification Limits
8 Inch		
7 Inch		
6 Inch		
5 Inch		
4 Inch		
3 Inch		
2 1/2 Inch		
2 Inch		
1 1/2 Inch	100.0%	
1 1/4 Inch		
1 Inch	93.3%	
3/4 Inch	91.6%	
5/8 Inch		
1/2 Inch	90.6%	
3/8 Inch	88.2%	
1/4 Inch		
No. 4	83.9%	
No. 8		
No. 10	78.9%	
No. 16		
No. 20	74.5%	
No. 30		
No. 40	67.7%	
No. 50		
No. 60	58.6%	
No. 80		
No. 100	49.0%	
No. 200	37.8%	

SAMPLE ID	DATE SAMPLED	SAMPLED FROM	MATERIAL CLASSIFICATION / DESCRIPTION	Moisture %	Sand Equiv.	L.A. Abrasn	Deg'n	Dust Ratio	Sound	P.I.	Fracture %
S-3	6/4/2002	SE Quadrant of Stockpile	(SM) grayish-brown, silty SAND with gravel	12.8							

HWA GEOSCIENCES INC.

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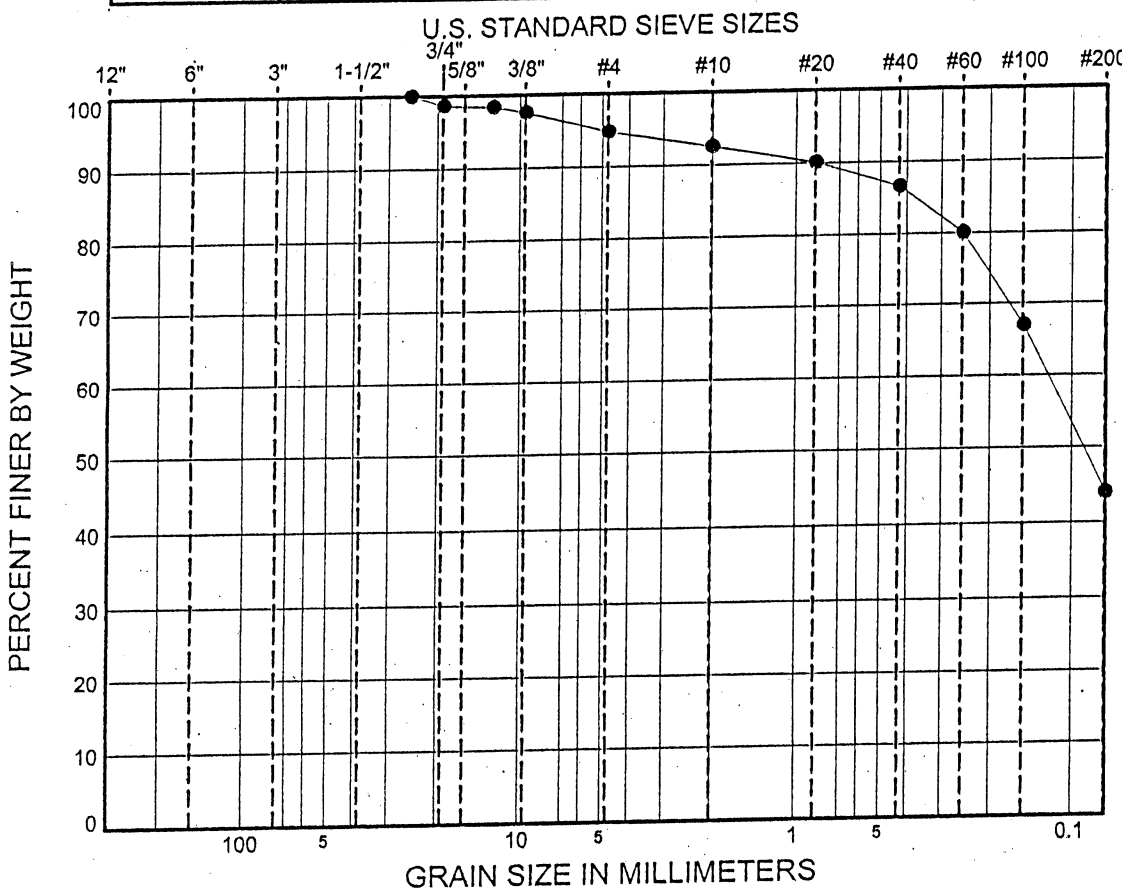
Assessment for Potential Use As Backfill
Unocal Site, Edmonds

SIEVE ANALYSIS OF SOIL / AGGREGATE
Aggregates- ASTM C136
Soils-ASTM D422

PROJECT NO.: 2002-101-22 FIGURE: 3



Sieve Size	Percent Passing	Specification Limits
8 Inch		
7 Inch		
6 Inch		
5 Inch		
4 Inch		
3 Inch		
2 1/2 Inch		
2 Inch		
1 1/2 Inch		
1 1/4 Inch		
1 Inch	100.0%	
3/4 Inch	98.6%	
5/8 Inch		
1/2 Inch	98.4%	
3/8 Inch	97.6%	
1/4 Inch		
No. 4	94.8%	
No. 8		
No. 10	92.5%	
No. 16		
No. 20	90.1%	
No. 30		
No. 40	86.6%	
No. 50		
No. 60	80.0%	
No. 80		
No. 100	67.0%	
No. 200	43.9%	

SAMPLE ID	DATE SAMPLED	SAMPLED FROM	MATERIAL CLASSIFICATION / DESCRIPTION	Moisture %	Sand Equiv.	L.A. Abrasn	Deg'n	Dust Ratio	Sound	P.I.	Fracture %
S-4	6/4/2002	NE Quadrant of Stockpile	(SM) grayish-brown, silty SAND	12.2							

HWA GEOSCIENCES INC.

Soil Stockpile Located At
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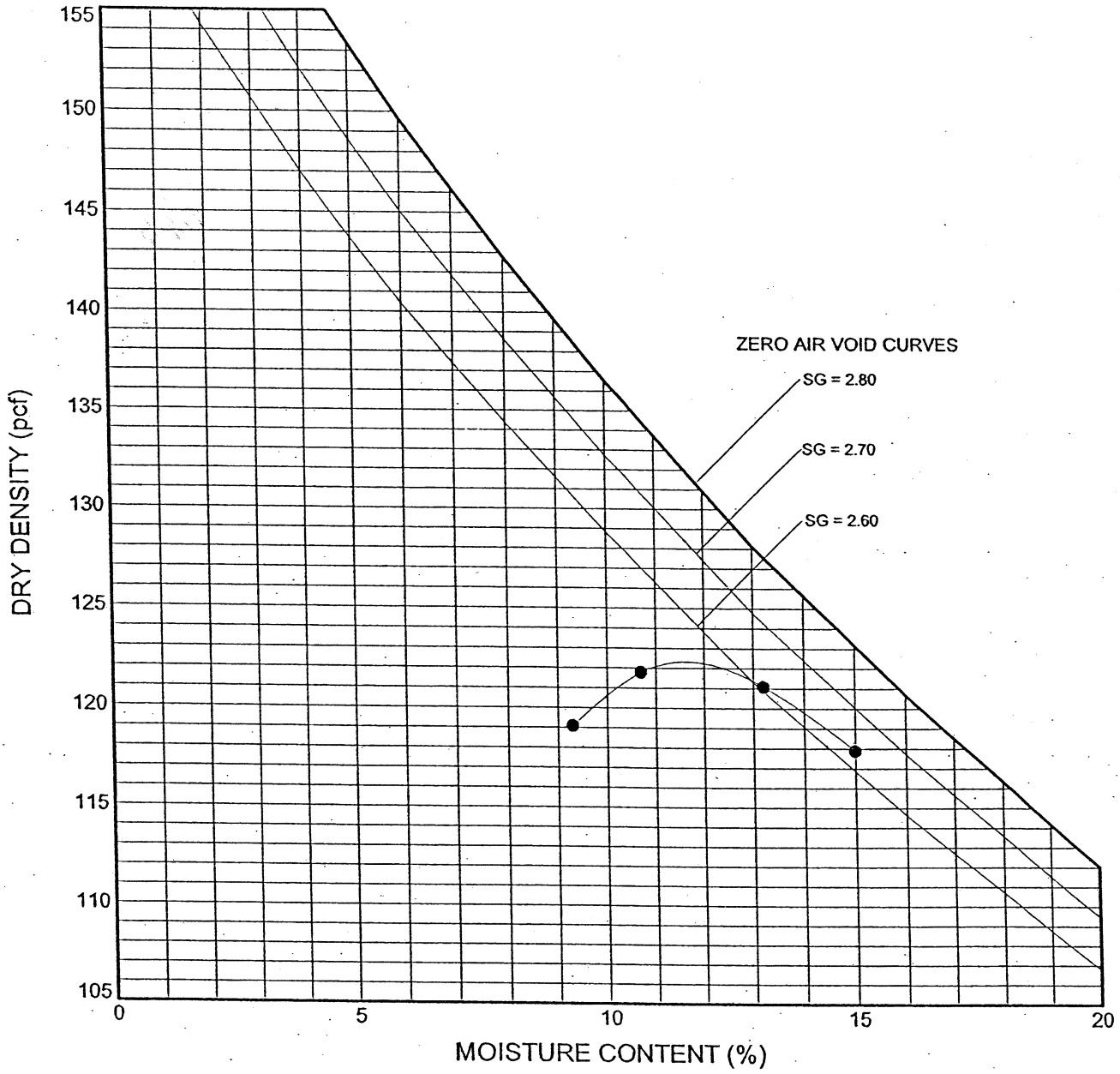
Assessment for Potential Use As Backfill
Unocal Site, Edmonds

SIEVE ANALYSIS OF
SOIL / AGGREGATE
Aggregates- ASTM C136
Soils-ASTM D422

PROJECT NO.: 2002-101-22 FIGURE: 4

SAMPLE	DEPTH (ft)	CLASSIFICATION
S-1&2&3		(SM) silty SAND (composite sample)



TEST METHOD: ASTM D 1557C	
MAXIMUM DRY DENSITY (pcf)	122.3
OPTIMUM MOISTURE CONTENT (%)	11.7
INITIAL MOISTURE CONTENT (%)	

HWA GEOSCIENCES INC.

Soil Stockpile Located At
22430 Dogwood Lane, Woodway, WA
Assessment for Potential Use As Backfill
Unocal Site, Edmonds

COMPACTION
TEST RESULT

PROJECT NO.: 2002-101-22 FIGURE: 5

9077.01.07

FACSIMILE COVER SHEET

A.A.R. TESTING LABORATORY INC.
(DWBE-D2F470831)

7126 180th Ave NE #C-101
PO Box 2523
Redmond WA 98073-2523

RECEIVED
APR 14 2003
By

TO:	Linda Dawson
FIRM:	MSA
PROJECT:	Edmonds Unical
TELEPHONE:	
FAX:	(425) 744-0919
FROM:	**Mike Holtz – Laboratory Technician**
TELEPHONE:	**(425) 881-5812**
FAX:	**(425) 881-5441**
DATE:	4/14/03

TOTAL PAGES (Including cover page): 1

MESSAGE: Sieve test results as per your request.

RE: 800 cy
Shoreline / Ballinger /
KC Soil

MAILED: YES NO X

Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
		45.8	6.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/4 in.	75.0		
3/4 in.	66.5		
1/4 in.	54.8		
#4	52.5		
#10	45.5		
#40	30.1		
#100	10.9		
#200	6.7		

* (no specification provided)

Soil Description

import drk med sand w/ 1 1/2" agg

103

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 10.5 D_{50}= 3.49

D_{30}= 0.423 D_{15}= 0.197 D_{10}= 0.138

C_u= 76.01 C_c= 0.12

Classification

USCS= AASHTO=

Remarks

tested/calculated by m.holtz

reviewed by a. hale

Sample No.: 1 Source of Sample: native bremerton site Date: 4/7/03

Location: Elev./Depth:

A.A.R. Testing Laboratory, Inc.

Client: Wyser Construction

Project: Unical Edmonds

Project No: 03-100 Plate

9077.01.07

FACSIMILE COVER SHEET

A.A.R. TESTING LABORATORY INC.
(DWBE-D2F470831)

7126 180th Ave NE #C-101
PO Box 2523
Redmond WA 98073-2523

TO:	Linda Dawson
FIRM:	MSA
PROJECT:	Edmonds Unical
TELEPHONE:	
FAX:	(425) 744-0919
FROM:	**Mike Holtz – Laboratory Technician**
TELEPHONE:	**(425) 881-5812**
FAX:	**(425) 881-5441**
DATE:	4/2/03

TOTAL PAGES (Including cover page): 2

MESSAGE: Proctor test results as per your request.

4/2/03 Call to Mike Holtz (on behalf of Wyser) to advise that Wyser also needs to run a particle size analysis.

MAILED: YES NO X